



# PUBLIC NOTICE

FEDERAL COMMUNICATIONS COMMISSION

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WASHINGTON, D.C. 20554

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**THE FCC'S ADVISORY COMMITTEE FOR  
THE 2000 WORLD RADIOCOMMUNICATION CONFERENCE  
OFFERS ADDITIONAL DRAFT PROPOSALS  
ON WRC-2000 ISSUES**

The WRC-2000 Advisory Committee has assisted the Commission in the development of proposals for the World Radiocommunication Conference to be held in the year 2000 (WRC-2000). On June 24, 1999 (its eighth meeting), the Advisory Committee proposed further draft proposals on issues that are to be addressed at WRC-2000.<sup>1</sup> In addition, the National Telecommunications and Information Administration's (NTIA) Radio Conference Subcommittee (RCS) has submitted to the Commission draft proposals (available on the FCC's WRC-2000 web site) that have been developed by the Executive Branch agencies. We request comments on all of these proposals.

Draft proposals developed by the Informal Working Groups (IWGs) of the FCC's WRC-2000 Advisory Committee include: 1) spectrum and regulatory issues for advanced mobile applications in the context of IMT-2000; 2) power flux density (PFD) limits to allow sharing among non-geostationary satellite orbit (NGSO) fixed-satellite service (FSS), geostationary satellite orbit (GSO) FSS, GSO broadcasting-satellite service (BSS), and the space sciences and terrestrial services; 3) future spectrum requirements of the aeronautical mobile-satellite service with respect to the Global Maritime Distress and Safety System (GMDSS); 4) relaxing the PFD requirements in Appendix S30 for BSS in Region 1; 5) protection of terrestrial services from NGSO satellite networks operating in the bands between 37.5 and 42.5 GHz; 6) use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz by high altitude platform stations (HAPS); 7) regulatory text to provide a framework for earth stations operating on board vessels in the 3700-4200 MHz and 5925-6425 MHz bands; and 8) future conference agendas.

The complete text of all preliminary views and proposals are available in the FCC's Reference Information Center, 445 12<sup>th</sup> Street, S.W., Room CY-A257, Washington, D.C. (telephone: 202-418-0270, TTY: 418-2555) or by accessing the FCC's WRC-2000 world wide web site at:

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<sup>1</sup>Previous preliminary views and/or draft proposals appeared in FCC Public Notices Nos. DA 98-842, released May 4, 1998, DA 98-1044, released June 3, 1998, DA 98-1125, released June 15, 1998, DA 98-1560, released August 5, 1998, DA 99-398, released February 26, 1999, and DA 99-595, released March 29, 1999.

<http://www.fcc.gov/wrc-00>. To comment on the above draft proposals, please submit an original and one copy of your comments to the Chief, Planning & Negotiations Division, International Bureau, Federal Communications Commission, 445 12th Street, SW., Washington, D.C. 20554. Comments should refer to the above draft proposals by document number. Parties preferring to e-mail their comments should address their comments to: [wrc-99@fcc.gov](mailto:wrc-99@fcc.gov). The deadline for submitting comments is July 30, 1999. The comments provided will be of assistance to the FCC in its upcoming consultations with the U.S. Department of State, the NTIA, and other government agencies for developing and updating U.S. preliminary views. Once approved by agreement among these U.S. Government agencies, preliminary views may be used by U.S. delegations to stimulate discussion and feedback and to attempt to achieve common proposals with other countries on these issues. The draft proposals set forth herein may evolve in the course of interagency discussions and therefore do not constitute a final U.S. Government position on these issues.

## **I. Draft Proposals of IWG-1 (Informal Working Group on Mobile Service Matters including IMT-2000)**

### **A. Proposals (WAC/113(24.06.99))**

*[Note: Items marked with an asterisk did not receive full agreement within IWG-1]*

## **UNITED STATES OF AMERICA**

### **[DRAFT] Proposals for Agenda Item 1.6.1**

**Issue:** Footnote and resolution for identifying IMT-2000 frequency bands

#### **Agenda Item: 1.6.1**

Review of spectrum and regulatory issues for advanced mobile applications in the context of IMT-2000, noting that there is an urgent need to provide more spectrum for the terrestrial component of such applications and that priority should be given to terrestrial mobile spectrum needs, and adjustments to the Table of Frequency Allocations as necessary.

#### **Background Information:**

IMT-2000, which can be considered the deployment of the third generation of mobile communications, is intended to provide future public telecommunications capable of broadband and multi-media applications. IMT-2000 is a global communications concept being developed by both sectors of the ITU. Although the terrestrial component of IMT-2000 will be implemented on a national basis, seamless global roaming and a high degree of commonality of design and compatibility of services are considered essential attributes of IMT-2000 systems.

Studies completed by ITU-R Task Group 8/1 forecast that, by 2010, 160 MHz of spectrum may be needed for terrestrial IMT-2000 systems (see Table 1). This requirement would be in addition to the 1 885-2 025/2 110-2 200 MHz bands already identified for FPLMTS in S5.388, and in addition to the spectrum already implemented by administrations for 1<sup>st</sup> and 2<sup>nd</sup> generation systems. In the U.S., the 1<sup>st</sup> and 2<sup>nd</sup> generation system bands include the bands 824-849/869-894 MHz (used for cellular telephony), 1850-1990 MHz (used for PCS), and bands at 800/900 MHz used by Enhanced SMR operations. The 1<sup>st</sup> and 2<sup>nd</sup> generation system bands are natural candidates for evolution to IMT-2000 services, assuming there is an evolution path that facilitates implementation from pre-IMT-2000 market technology.

TABLE 1

### Forecasted Terrestrial Spectrum Requirements

*Note: the figures in the table below represent the requirement in those geographic areas where the traffic is the highest.*

Region	Total Forecasted Terrestrial Mobile Spectrum Requirement for the year 2010 (MHz)	Identified Total Terrestrial Mobile Spectrum (including RR S5.388 IMT-2000 Spectrum) (MHz)	Forecasted Additional IMT-2000 Terrestrial Component Spectrum Requirement for the year 2010 (MHz)
Region 1	555	395	<b>160</b>
Region 2	390	230	<b>160</b>
Region 3	480	320	<b>160</b>

Report ITU-R M.[IMT.SPEC] concluded that there is a forecasted need for mobile-satellite spectrum as shown in Table 1. In calculating this spectrum need, Report ITU-R M.[IMT-SPEC] applies the detailed methodology provided in Recommendation ITU-R M.1391 *Methodology for the calculation of IMT-2000 satellite spectrum requirements* to traffic estimates on the future demand for mobile satellite communications. The total MSS spectrum requirement is larger than that for the satellite component of IMT-2000 alone (see Table 2).

TABLE 2

### Forecasted Global Mobile Satellite Spectrum Requirements, including IMT-2000 Satellite Component (MHz)

*Note: the figures in the table below represent the requirement in those geographic areas where the traffic is the highest.*

	Year 2005	Year 2010
IMT-2000 (satellite component <sup>1</sup> )	2 x 31.5	2 x 67

#### USA/1.6.1/ 1 MOD

Total MSS (IMT-2000 satellite component <sup>1</sup> and other MSS requirements)	2 x 123	2 x 145
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In the various Regions, consideration should be given to the existing spectrum allocated to the MSS and used by pre-IMT-2000 systems. Because the “Total MSS” spectrum calculation includes the MSS spectrum required for both pre-IMT-2000 and IMT-2000 systems, a subtraction of the existing MSS spectrum used by pre-IMT-2000 systems must be performed to determine the additional satellite spectrum required for the IMT-2000 satellite component in the years 2005 and 2010. This subtraction has not been done in Report ITU-R M.[IMT-SPEC], due to the variation across Administrations of the spectrum allocated to the MSS and used by pre-IMT-2000 systems.

In the US and around the world 1<sup>st</sup> and 2<sup>nd</sup> generation MSS systems are being deployed in the 1.5/1.6 GHz MSS allocations. Some 2<sup>nd</sup> generations MSS systems may even be deployed in the 2 GHz MSS bands identified for IMT-2000.

Administrations may implement IMT-2000 systems in frequency bands allocated to the mobile service and mobile satellite service. However, since some of these bands may have constraints on the deployment of IMT-2000 because of their use by other services, frequency bands suitable for IMT-2000 should be identified in the Radio Regulations. Since IMT-2000 is a global communications concept developed by the ITU, reference to IMT-2000 in the Radio Regulations facilitates its deployment. It would be possible that both existing bands and additional bands could be listed in a modification to No. S5.388 and a new Resolution. Different dates of introduction for IMT-2000 bands can be given in the new resolution.

#### PROPOSAL;

**S5.388** The bands or portions thereof ~~1 885-2 025 MHz and 2 110-2 200 MHz~~ listed below are intended for use, on a worldwide basis, by administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000). Such use does not preclude the use of these bands by other services to which they are allocated. The bands should be made available for IMT-2000 in accordance with Resolution ~~212 (Rev.WRC-97)~~ **IMT**.

<sup>1</sup> This is the spectrum requirement for the satellite component over and above what has been identified in Res. 212(Rev. WRC-97).

**USA/1.6.1/ 3** 806-902 MHz, 1 710-1 755 MHz, 1 850-1 885 MHz, 1 885 – 1 980 MHz, 2 110-2 160 MHz\* on a worldwide basis for the terrestrial component of IMT-2000.

1 525-1 559/1 626.5-1 660.5 MHz, 1 610-1 626.5/2 483.5-2 500 MHz, 1 990-2 010/2 170-2200 MHz, 2500-2520/2670-2690 MHz\* (RR S5.414 and S5.419) on a worldwide basis for the satellite component.

1 755-1 850 MHz, 2 520-2 670 MHz\*, 806-902 MHz, 1 980-1 990 MHz, and 2 160-2 200 MHz on a regional or country basis for the terrestrial component

2 520-2 535/2 655-2 670 MHz (all Regions)\*, 2 010-2 025/2 160-2 170 MHz (Region 2)\*, 1 980-1 990 MHz (Regions 1 and 3) on a regional or country basis for the satellite component.

**Reasons:** To identify spectrum for IMT-2000 to facilitate consistent deployment of IMT-2000 systems. Since WARC-92 initially identified 230 MHz of spectrum for FPLMTS, the tremendous growth in mobile communications services and the forecasted demand for wideband multimedia services indicate that additional frequency bands must be identified to satisfy these requirements.

**SUP Res. 212(Rev. WRC-97)**

**REASON:** Consequential to the proposals USA/1.6.1/1 and USA/1.6.1/3.

## **ADD RESOLUTION IMT (WRC-2000)**

### **International Mobile Telecommunications-2000 (IMT-2000)**

The World Radiocommunication Conference (Istanbul, 2000),

*considering*

- USA/1.6.1/ 2**
- a) that IMT-2000 is the ITU vision of global mobile access in the 21<sup>st</sup> century and is scheduled to start service around the year 2000;
  - b) that IMT-2000 is an advanced mobile communications concept intended to provide telecommunications services on a worldwide scale regardless of location, network or terminal used;
  - c) that through integration of terrestrial mobile and mobile satellite systems, different types of wireless access will be provided globally, including services available through the fixed telecommunications networks and those specific to mobile users;
  - d) that the bands 1 885-2 025 MHz and 2 110-2 200 MHz were identified by WARC-92 as intended for use on a worldwide basis by administrations wishing to implement International Mobile Telecommunications-2000 (IMT-2000) and that such use would not preclude the use of these bands by

- e) other services to which they are allocated;
- f) that ITU-R Report M.[IMT.SPEC] Spectrum Requirements for IMT-2000, forecasted an additional need for 160 MHz of spectrum on a global basis for the terrestrial component in the year 2010, in addition to the frequency bands listed in considering d);
- g) that ITU-R Report M.[IMT.SPEC] Spectrum Requirements for IMT-2000, forecasted an additional need of spectrum on a global basis for the satellite component of IMT-2000 as being 2 x 31.5 MHz in the year 2005 and 2 x 67 MHz in the year 2010.
- h) that the 160 MHz of additional terrestrial spectrum for IMT-2000 presented in the ITU-R's Draft New Report M[IMT-SPEC] is for additional spectrum beyond that amount identified at WARC'92 and the bands currently in use by cellular and PCS systems in each of the Regions; and
- i) that the radio specifications, as well as their various technical characteristics, as presented in ITU Recommendations, support the evolution of existing cellular and PCS systems to IMT-2000;

*considering further*

- a) that ITU is progressing in its efforts to finish development of the IMT-2000 concept; and
- b) that various technical approaches either exist or will soon be available to provide for global roaming across mobile radio systems that operate in different frequency bands and with different technical characteristics.

*noting*

- a) that the identification of spectrum for IMT-2000 does not convey any status under the Radio Regulations of the ITU.
- b) that the implementation of the terrestrial component of IMT-2000, within the bands identified, is expected to commence in some bands as early as the year 2000, subject to market and technical considerations; and
- c) that the implementation of the satellite component of IMT-2000, in the bands identified and allocated to the MSS, could commence in some bands as early as the year 2000, subject to market and technical considerations;

*invites administrations*

to give due consideration to the accommodation of other services currently operating in these bands when implementing IMT-2000,

*resolves*

- a) that administrations planning to implement new terrestrial mobile radio communications services, including terrestrial IMT-2000 systems that provide for roaming on a global basis, consider the use of the following bands or portions thereof: existing cellular and PCS bands within the range 806-902 MHz, 1 710-1 755 MHz, 1 850-1 885 MHz, 1 885-1 980 MHz, 2 110-2 160 MHz\*;
- b) that administrations planning to implement satellite IMT-2000 systems on a global basis, consider the use of the following bands or portions thereof: 1 525-1 559/1 626.5-1 660.5 MHz, 1 610-1 626.5/2 483.5-2 500 MHz, 1 990-2 010/2 170-2 200 MHz, and 2 500-2 520/2 670-2 690 MHz\*;
- c) that administrations planning to implement additional terrestrial mobile radio communications services, including those supported on IMT-2000 systems on a regional/national basis, consider the use of the following bands or portions thereof: 1755-1850 MHz, 2520-2670 MHz\*, 806-902 MHz, 1 980-1 990

- MHz, and 2 160- 2 200 MHz;
- d) that administrations planning to implement additional satellite IMT-2000 systems on a national/regional basis, consider the use of the following bands or portions thereof: 2 520-2 535/2 655-2 670 MHz\* (all Regions)(RR S5.414 and S5.419) and 2 010- 2 025/2 160-2 170 MHz\* (Region 2);

*urges*

- a) administrations to study and consider the possible use of the regional/national frequency bands listed in resolves c) and d) in the longer term, with a view to harmonizing spectrum on a worldwide basis for IMT-2000 and other global telecommunication systems;
- b) administrations planning to provide for the introduction of new spectrum for advancing mobile radio communications systems to consider flexible regulatory approaches on a national level that will support the evolution of advancing mobile radio systems, including existing cellular and PCS systems and future IMT-2000 systems, to facilitate the most rapid and cost effective introduction of new services and technologies as they become available; and
- c) administrations deploying IMT-2000 systems to use the relevant international technical characteristics, as identified by ITU-R and ITU-T Recommendations;

**REASON:** To identify spectrum for IMT-2000 to facilitate consistent deployment of IMT-2000 systems. Since WARC-92 initially identified 230 MHz of spectrum for FPLMTS, the tremendous growth in mobile communications services and the forecasted demand for wideband multimedia services indicate that additional frequency bands must be identified to satisfy these requirements.

## **II. Draft Proposals of IWG-2 (Informal Working Group on NGSO Mobile-Satellite Service Below 1 GHz)**

(Proposals for WRC-2000 Agenda Item 7.2 were coordinated with IWG-10)

**A. Proposals for WRC-2000 Agenda Item 4 and 7.2** (These proposals are primarily based on WAC/080(24.06.99) with minor edits incorporated from WAC/095(24.06.99). They are being used in lieu of WAC/094(24.06.99).)

### **United States of America Proposal for the Work of the Conference to amend Resolution 722 to add an Agenda Item**

#### **Proposal for Agenda Item 4**

“in accordance with Resolution **95 (WRC-97)**, to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;”

The proposal herein amends Resolution 127: to take account of the current status of ITU-R studies on the compatibility of non-GSO MSS feeder links in bands around 1.4 GHz with services in the same and nearby bands; and to invite WRC-02/03 to include in its agenda consideration of allocations to non-GSO MSS feeder links in bands around 1.4 GHz.

References: IWG-2/27 (Revs. 1 and 2); WRC-2000 Agenda Item 7.2; WRC-02/03 Preliminary Agenda Item 3.5;

and Doc. 8D/251 (which is based on US WP 8D/1).

## Background

Resolution 127, adopted at WRC-97, resolved that studies should be carried out as a matter of urgency on the operational and technical measures required:

- i. to facilitate sharing between feeder links for non-GSO MSS systems and existing and currently planned services in portions of the band 1390-1400 MHz (Earth-to-space) and 1427-1432 MHz (space-to-Earth); and
- ii. to protect passive services in the band 1400-1427 MHz from unwanted emissions from feeder links for non-GSO MSS systems;

and invited WRC-2000 or a future competent conference to consider, on the basis of completion of the above mentioned studies, additional allocations for feeder links on a worldwide basis for non-GSO MSS systems with service links below 1 GHz.

However, WRC-97 did not recommend for inclusion in the preliminary agenda for WRC-2000 consideration of studies or additional allocations for feeder links to non-GSO MSS around 1.4 GHz. And, in fact, the agenda for WRC-2000 does not include any such items.

WRC-97 did recommend for the preliminary agenda of WRC-02/03 an item related to additional allocations on a worldwide basis to non-GSO MSS for feeder links around 1.4 GHz (Item 3.5), but that item proposed only *consideration of the results of studies* [of operational and sharing measures] *with a view to considering the additional allocations themselves at a future conference*, that is, one beyond WRC-02/03.

IWG-2/27 (Revs. 1 and 2) previously adopted by this IWG, described a U.S. proposal for WRC-2000 to amend the Preliminary Agenda of WRC-02/03 to include consideration of the allocations themselves.

Consistent with that proposal, this present proposal would amend Resolution 127 to have it call for this same item on the agenda of WRC-02/03.

The rationale for including consideration of allocations to MSS feeder links near 1.4 GHz in the agenda of WRC-02/02 is that some of the studies referred to in Res. 127, and in the preliminary agenda for WRC-02/03, have been completed, and that others are planned for completion prior to the convening of WRC-02/03.

Therefore, WRC-02/03 will likely have before it the technical and sharing measures, and sharing and compatibility studies that would enable it to consider additional allocations around 1.4 GHz to non-GSO MSS for feeder links.

The studies performed to date indicate that out-of-band emissions from MSS feeder links at 1390-1393 MHz (up), and 1429-1432 MHz (down) into the band 1400-1427 MHz, which is allocated on a primary basis exclusively to sensitive, passive science services, can be reduced through the use of highly efficient modulation methods such as GMSK, and through careful design, which will keep intermodulation products out of that neighboring band.

Those studies now have a certain measure of acceptance from the science services themselves (Doc. ITU-R 8D/251). The current or remaining concerns of these services -- Radio Astronomy, Earth exploration-satellite (passive), and Space Research (passive) -- are whether the results indicated by theory and preliminary measurement and testing can be achieved throughout the life of operational spacecraft. It is these latter tests, among others, that are planned to be available before WRC-02/03 convenes.

If the additional tests and measurements are persuasive, but the item was not previously put on the agenda of WRC-02/03 by WRC-2000, then the conference would not be competent to consider those allocations.

If the additional tests and measurements that would be conducted between now and the convening of WRC-02/03 are not persuasive, and the item is on its agenda, then WRC-02/-3 would not, in its good judgment, make any such allocations, even though it was competent to do so. In other words, putting the item on the preliminary agenda of WRC-02/03 is both foresighted and "fail- safe."

### **Preliminary View**

This proposal is consistent with the current Preliminary View of the U.S.:

It is anticipated that studies will be sufficiently advanced or completed, prior to WRC-2000, so that the U.S. may be in a position to request modification to agenda items 3 and 3.5 of WRC-02/03. These modifications could be to ask for consideration of the allocations at WRC-02/03 and to not defer consideration to a future Conference.

### **Supporting Information**

Information can be found in Document IWG-2/27 on the following subjects: substantiating the need of non-GSO MSS systems for additional spectrum; the technical factors which make frequencies above 1 GHz preferable for feeder links; the feasibility of sharing frequencies above 1 GHz with terrestrial services; and the fact that using frequencies above 1 GHz for feeder links reduces the pressure for use of frequencies below 1 GHz, which are in great demand for other mobile services, as well as for non-GSO MSS service links for which they are technically better suited.

A detailed discussion of the compatibility of feeder links around 1.4 GHz with the science services in a nearby band can be found in ITU-R Doc. WP 8D/251 (derived from USWP 8D/1).

### **Proposal**

The proposed revisions to Resolution 127, and the Reason for its revision, are given in the Annex.

In addition, this proposed change to Resolution 127 also requires that Resolution 722 be amended to add an agenda item under item 2., "to address allocation of the 1.4 GHz spectrum on the basis of proposals from administrations and the Report of the Conference Preparatory Meeting, and taking account of the results of WRC-99, to consider and take appropriate action in respect of the following topics:".

Proposed new item 2.1N to read: "allocations on a worldwide basis for feeder links in bands around 1.4 GHz to the non-geostationary mobile-satellite services with service links operating below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolution **127**;" With this item added, agenda item 3.5 of Resolution 722 can be deleted.

## **ANNEX**

USA/w/1  
MOD

### **RESOLUTION 127 (WRC-2000)**

**Studies relating to consideration of allocations in bands around 1.4 GHz for feeder links of the non-geostationary satellite systems in the mobile –satellite service with service links operating**

**below 1 GHz**

The World Radiocommunication Conference (1997 Istanbul 2000),

*considering*

- a) that the agenda of ~~this Conference~~ WRC-97 included consideration of the adoption of additional allocations for the non-geostationary (non-GSO) mobile-satellite systems in the mobile-satellite service (MSS);
- b) that the Report of the 1997 9 Conference Preparatory Meeting (CPM-97 9) stated that the Radiocommunication Bureau has identified at least [22] non-GSO MSS networks [as of 28 April, 1999] at frequencies below 1 GHz, at some state of coordination under Resolution 46 and that many of the proposed networks cannot be implemented in the existing allocations because there is not enough spectrum;
- c) that CPM-97 stated that due to the extreme sensitivity of radio astronomy observations interference from unwanted (spurious and out-of-band) emissions can be a problem. However, CPM-97 noted that interference to radio astronomy can be avoided using various techniques including low-power transmitter levels, choice of modulation, bit shaping, output filtering and band limiting filters. Use of these techniques can minimize the band separation necessary to meet the recommended interference threshold levels for out-of-band emissions;
- de) that factors taken into account by ~~these~~ post-CPM-97 activities in order to protect the passive services around 1.4 GHz from out-of-band emissions include: the use of narrow-band non-GSO MSS feeder-link transmissions; the use of spectrum-efficient modulation methods, such as GMSK, having inherently rapid roll-off of out-of-band emissions; the use, where necessary, of band-pass filters in satellite transmitters and MSS feeder-link transmitting earth stations; and guardbands where necessary;
- ef) that factors taken into account by ~~these~~ post-CPM-97 activities concerning sharing with radiolocation include the use of conventional techniques that may be applied in MSS satellite receivers, such as intermediate frequency limiters and time diversity, which have long been employed to protect radiolocation receivers, and techniques such as transmitted waveforms employing time diversity, which have been employed to protect receivers in other services from high-power pulsed radar transmitters,
- fd) that, since WRCCPM-97, one administration has ITU-R studies have been carried out containing theoretical additional analyses and hardware demonstrations with a view to determining the feasibility of sharing between if the operation of non-GSO MSS feeder links in bands around 1.4 GHz would be compatible with and services such as the Earth exploration-satellite (passive), radio astronomy and space research (passive), radio astronomy and space research (passive) services in bands around 1.4 GHz;
- g) that the theoretical analyses and preliminary hardware demonstrations conducted have indicated that sufficient reduction of out-of-band and spurious emissions could be achieved to protect the sensitive science services in nearby bands;
- h) that additional tests and measurements of feeder link transmissions from systems having the characteristics, performance, and reliability of equipment that would be used in operational systems are necessary;
- i) that such additional tests and measurements may be conducted within at least one administration prior to WRC-02/03,

*recognizing*

that the bands near 1.4 GHz are extensively used by many other services operating in accordance with the Radio Regulations, including fixed and mobile systems,

*noting*

- a) that Resolution **214 (WRC-97)** states under *resolves* 1. that further studies are urgently required on operational and technical means to facilitate sharing between non-GSO MSS and other radiocommunications services having allocations below 1 GHz;
- b) ~~that a former resolution identified issues relating to frequency sharing between the mobile satellite service and terrestrial services below 3 GHz as being among the urgent studies required in preparation for WRC 97;~~
- c) ~~that one administration performed such studies, which were submitted to ITU-R, but these studies could not be considered due to time limitations;~~
- b~~d~~) that, since WRC-95, ~~one administration has performed studies on~~ such ITU-R studies have been carried out on sharing between space and terrestrial services and feeder links near 1.4 GHz for non-GSO MSS systems with service links below 1 GHz,

*resolves*

1. to invite ITU-R, as a matter of urgency to carry out additional studies to determine the operational and technical measures required to facilitate sharing in portions of the band 1390-1400 MHz between existing and currently planned services and feeder links (Earth-to-space) for non-GSO MSS systems with service links operating below 1 GHz;
2. to invite ITU-R, as a matter of urgency to carry out additional studies to determine the operational and technical measures required to facilitate sharing in portions of the band 1427-1432 MHz between existing and currently planned services and feeder links (space-to-Earth) for non-GSO MSS systems with service links operating below 1 GHz;
3. to invite ITU-R, as a matter of urgency, to ~~study operational and technical measures required~~ carry out additional studies, including the measurement of emissions from equipment that would be employed in operational systems to protect passive services in the band in the band 1400-1427 MHz from unwanted emissions from feeder links near 1.4 GHz for non-GSO MSS systems with service links operating below 1 GHz;
4. to invite WRC-02/03 ~~a future competent conference\*~~ to consider, on the basis of completion of studies in *resolves* 1, 2, and 3, additional allocations in the above bands for feeder links on a world-wide basis non-GSO MSS systems with service links below 1 GHz;

*urges administrations*

to participate actively in such studies, with the involvement of interested parties.

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*\* Note by the Secretariat: See Resolution **722 (WRC-97)**.*

**REASON:** To take account of the current status of ITU-R studies on the compatibility of non-GSO MSS feeder links in bands around 1.4 GHz with services in the same and nearby bands. And to invite WRC-02/03 to include in its agenda consideration of allocations to non-GSO MSS feeder links in bands around 1.4 GHz.

United States of America  
**PROPOSALS FOR THE WORK OF THE CONFERENCE**  
**Proposal to add an Agenda Item to Resolution 722**

(to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent Conference and on possible agenda items for future conferences)

**Background Information:**

It is proposed to add an item to Resolution 722, Preliminary Agenda for the 02/03 World Radiocommunication Conference, to include consideration of allocations for feeder links in bands around 1.4 GHz to the non-GSO/MSS with service links operating below 1 GHz, as invited by the modified Resolution 127.

**Proposals:**

RESOLUTION 722 (WRC-1997)  
**Preliminary Agenda for the 2002/03 World Radiocommunication Conference**

USA/w/2

ADD

2.1N “allocations on a worldwide basis for feeder links in bands around 1.4 GHz to the non-geostationary mobile-satellite services with service links operating below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolution **127**.”

**Reason:** To include in the WRC-02/03 Agenda the consideration of additional allocations for the non-GSO/MSS as invited by Resolution 127 as revised by WRC-2000.

USA/w/3

SUP

Suppress section 3.5 in Resolution 722 (WRC-97)

**Reason:** The proposed addition to Resolution 722 addresses Resolution **127**.

**B. Proposals for WRC-2000 Agenda Items 1.11, 4 and 7.2** (The following is WAC/081(24.06.99) with minor edits from WAC/096(24.06.99).)

## Draft United States Proposal

### **Modification of Resolution 214 (Rev. WRC-97)**

#### **Sharing Studies Relating to Consideration of the Allocation of Bands**

#### **below 1 GHz to the Non-Geostationary Mobile-Satellite Service**

#### **and to add an Agenda Item to Resolution 722**

#### *(Section One - Support Information)*

The [draft] CPM Report to WRC-2000 indicates a requirement of 7 to 17 MHz of additional spectrum required for service links in the non-geostationary mobile-satellite service (non-GSO MSS) below 1 GHz. Additionally, 4 MHz of shared spectrum is identified as the required spectrum for MSS feeder links. These requirements will not likely be met by additional allocations to the non-GSO MSS at WRC-2000. Thus, there remains an urgent need for usable spectrum to be made available on a worldwide basis for non-GSO MSS systems operating below 1 GHz.

In response to Resolution 214 (Rev. WRC-97), ITU-R studies have shown that for specific cases, co-frequency sharing between the non-GSO MSS and the existing services below 1 GHz may be achieved. However, other cases including the network aspects of digital trunked systems have not been taken into account. Consequently, the operational and technical means to facilitate sharing have not been studied for some systems operating in some parts of the world.

The continued study and development of Recommendations by the ITU-R on the performance requirements, sharing criteria and the technical and operational issues relating to sharing between the existing services and non-GSO MSS below 1 GHz can provide the technical basis for the consideration at WRC-2002/03 of additional allocations on a worldwide basis for the non-GSO MSS below 1GHz. Therefore, the USA proposes the continuance of Resolution 214 as modified by this proposal.

Consideration of the technical and regulatory constraints on non-GSO MSS allocations in the bands below 1 GHz was addressed by WRC-2000. Therefore, that aspect is proposed for deletion from Resolution 214.

The second proposal in this paper results from the first. It is proposed to modify Resolution No. 722, Preliminary Agenda for the 02/03 World Radiocommunication Conference, to include the consideration of additional allocations to the non-GSO MSS as invited by the modified Resolution 214.

*(Section Two - Proposals)*

**United States of America**

**PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Proposal for Agenda Item 1.11**

(To consider constraints on existing allocations and to consider additional allocations on a worldwide basis for the non-geostationary (non-GSO)/MSS below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolutions No. 214 (Rev. WRC-97) and 219 (WRC-97))

**Background Information:**

It is proposed to modify Resolution 214 (Rev. WRC-97):

1. to invite continued ITU-R study of the technical and operational measures to facilitate sharing between the non-GSO MSS and existing services below 1 GHz;
2. to invite WRC-2002/03 consideration of additional allocations to the non-GSO MSS below 1 GHz;
3. to delete from Resolution 214 the consideration of technical and regulatory constraints on the non-GSO MSS allocations in the bands below 1 GHz, which was addressed by WRC-2000.

**Proposal:**

USA/x/1

MOD

**RESOLUTION 214 (Rev.WRC-972000)**

**Sharing studies relating to consideration of the allocation of bands  
below 1 GHz to the non-geostationary mobile-satellite service**

The World Radiocommunication Conference (~~Geneva, 1997~~Istanbul, 2000),

*considering*

- a) that the agenda of this Conference included consideration of additional allocations on a worldwide basis for the non-geostationary mobile-satellite service (non-GSO MSS) below 1 GHz;
- b) that the 1997~~9~~ Conference Preparatory Meeting, in its Report, indicated that for the non-GSO MSS below 1 GHz there is not enough spectrum currently allocated to allow development of all the systems currently in coordination, and that, in order to meet projected MSS requirements below 1 GHz, a range of an additional 7 to 10 MHz will be required in the near future although, as well, it recognized that a number of these systems may not be implemented for reasons not connected with spectrum availability;
- c) that there is an urgent need to make usable spectrum available on a worldwide basis for non-GSO MSS systems operating below 1 GHz;

- d) that some non-GSO MSS systems are already operated by some administrations in existing MSS allocations and are at an advanced stage of consideration for operation in many other administrations, and that studies have been conducted within ITU-R on sharing between non-GSO MSS and certain terrestrial services which demonstrate the feasibility of sharing in the cases studied;
- e) that issues concerning the technical and operational means to facilitate sharing between the terrestrial services and non-GSO MSS in the bands below 1 GHz remain to be studied;
- f) that the requirements for the introduction of these new technologies have to be balanced with the needs of other services having allocations below 1 GHz;
- g) that the bands below 1 GHz are extensively used by administrations for many services, although the extent to which they are used by each administration varies throughout the world,

*noting*

- a) that additional studies may identify other bands below 1 GHz which could also be considered suitable for a worldwide allocation to non-GSO MSS;
- b) that, based on the sharing techniques being developed for MSS below 1 GHz and the current use of the band 138-470 MHz by terrestrial services, this range may be considered for further study;
- c) that constraints on the duration of any single transmission from an individual MSS mobile earth station and constraints on the period between consecutive transmissions from an individual MSS mobile earth station operating on the same frequency may facilitate sharing with terrestrial services;
- d) that interference mitigation techniques, such as the dynamic channel activity assignment system described in Recommendation ITU-R M.1039-4, may be used by non-GSO MSS systems below 1 GHz in the Earth-to-space direction to promote compatibility with terrestrial systems when operating in the same frequency band;
- e) that new technologies employed by some radiocommunication services, especially within the terrestrial mobile and broadcasting services, which require spectrum below 1 GHz, may have an impact on the sharing possibilities;
- f) that substantial progress has been made by the completion of ITU-R studies to date of sharing between the non-GSO MSS below 1 GHz and existing specific services, however, studies on some important issues remain to be completed;
- ~~fg)~~ that non-GSO MSS systems operating below 1 GHz have undergone advance publication by the Radiocommunication Bureau and that administrations may seek to implement further such systems;
- ~~g)~~ ~~that there may be a need to review constraints on the current allocation to the MSS below 1 GHz,~~

*resolves*

- 1 that further studies are urgently required on operational and technical means to facilitate sharing between the non-GSO MSS and other radiocommunication services having allocations and operating below 1 GHz;
- 2 that WRC-~~99~~2002/03 be invited to consider, on the basis of the results of the studies conducted within ITU-R and the studies referred to in *resolves* 1 above, additional allocations on a worldwide basis for the non-GSO MSS below 1 GHz;
- 3 that relevant entities and organizations be invited to participate in these sharing studies;
- ~~4 that WRC 99 be invited to consider a review of the technical and regulatory constraints on non-GSO MSS allocations in the bands below 1 GHz, taking into account considering d);~~

*invites ITU-R*

- 1 to study and develop Recommendations on, as a matter of urgency, the performance requirements, sharing criteria and technical and operational issues relating to sharing between ~~both existing and planned~~ services and non-GSO MSS below 1 GHz;

~~2~~ as a matter of urgency, to carry out studies in preparation for WRC-99, including a review of the operating constraints referred to in *noting c)* necessary to protect the existing and planned development of all the services to which the bands below 1 GHz are allocated, having regard to *noting d)*;

~~32~~ as a matter of urgency, to carry out studies in preparation for WRC-99/2002/03 with respect to interference mitigation techniques, such as the dynamic channel activity assignment system described in Recommendation ITU-R M.1039-4, necessary to permit the continued development of all of the services to which the bands are allocated;

~~4~~ to carry out a review for a future competent conference of the technical and regulatory constraints on non-GSO MSS allocations in the bands below 1 GHz, having regard to *considering d)*;

~~53~~ to bring the results of these studies to the attention of WRC-2002/03 and the relevant preparatory meetings,

*urges administrations*

1 to participate actively in these studies, with the involvement of both terrestrial and satellite interests;

2 to submit to ITU-R reports on their technical studies and on their operational and frequency sharing experience with non-GSO MSS systems operating below 1 GHz,

*encourages administrations*

to consider the use of dynamic channel assignment techniques, such as those described in Recommendation ITU-R M.1039-4.

**Reasons:** There remains an urgent need for usable spectrum to be made available on a worldwide basis for non-GSO MSS systems operating below 1 GHz. Requirements have been identified for 7 to 17 MHz of additional spectrum for service links in the non-GSO MSS below 1 GHz and an additional 4 MHz for MSS feeder links.

The continued study and development of Recommendations by the ITU-R on the performance requirements, sharing criteria and the technical and operational issues relating to sharing between the existing services and non-GSO MSS below 1 GHz can provide the technical basis for the consideration at WRC-2002/03 of additional allocations on a worldwide basis for the non-GSO MSS below 1 GHz. Therefore, the USA proposes the continuance of Resolution 214 as modified by this proposal.

**United States of America**

**PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Proposal for Agenda Item 4**

**(In accordance with Resolution 95, to review the Resolutions and Recommendations of the previous**

conferences with a view to their possible revision, replacement or abrogation)

**Background Information:**

It is proposed to add an item to Resolution 722, Preliminary Agenda for the 02/03 World Radiocommunication Conference, to include consideration of non-GSO MSS allocations below 1 GHz as invited by the modified Resolution 214.

**Proposal:**

USA/x/2

ADD

RESOLUTION 722 (WRC-1997)

**Preliminary Agenda for the 2002/03 World Radiocommunication Conference**

2.AA to consider additional allocations on a worldwide basis for the non-GSO/MSS below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolution No. 214 (Rev. WRC-2000);

**Reason:** To include in the WRC-02/03 Agenda the consideration of additional allocations for the non-GSO/MSS as invited by Resolution 214 (Rev. WRC-2000).

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**C. Proposals for Agenda Items 1.11 and 7.2** (WAC/082(24.06.99) with minor edits from WAC/097(24.06.99))

**United States of America**  
**Proposal for the Work of the Conference**

**Proposal for Agenda Item 1.11**  
**and to Add an Agenda Item to Resolution 722**

“to consider constraints on existing allocations and to consider additional allocations on a worldwide basis for the non-geostationary (non-GSO) MSS below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolutions **214 (Rev. WRC-97)** and **219 (WRC-97)**”

## **Modification of Resolution 219**

The proposal herein amends Resolution 219 to take into account the most recent studies supporting the need for additional spectrum for non-GSO MSS, and the possibility of increasing the efficiency of spectrum utilization in the band 401-406 MHz by existing systems which might make it possible for a portion of the band segment 405-406 MHz be allocated to non-GSO MSS. The proposal recommends that this allocation be considered at WRC-02/03.

### **Background**

Resolution 219, adopted at WRC-97, noted the significant shortfall of spectrum for non-GSO MSS below 1 GHz and that there is an urgent need to make additional spectrum available on a worldwide basis for such systems.

It also noted that the development of more spectrum-efficient meteorological aids systems is continuing in order to minimize the bandwidth required by these systems.

The Revised Resolution adds a new invitation to the ITU-R to study such more spectrum-efficient technologies and operational techniques on an urgent basis.

### **Preliminary View**

The "U.S. should pursue an allocation in the NVNG MSS in the 405-406 MHz band, pending the results of ITU-R studies..." (The remainder of the Preliminary View notes the need for the development of a transition plan for metajds, and the need to protect services in nearby bands.)

### **Supporting Information**

Studies are underway to examine spectrum efficient utilization of this band. A preliminary study of one such spectrum-efficient technology, based on CDMA, has been submitted to US WP 7C (Doc. USWP 7C/78) for its consideration. While several problems and limitations of this technique have been noted in the United States and elsewhere, further study is continuing.

### **Proposed Agenda Item for Resolution 722 (WRC-2003/4):**

Provide new agenda item 2.1N for WRC-02/03 as follows:

“to consider additional allocations on a worldwide basis for the non-geostationary (non-GSO) MSS below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolution **219 (WRC-2000)**;

**Proposal**

USA/z/1  
MOD

**RESOLUTION 219 (WRC-97-2000)**

**STUDIES RELATING TO CONSIDERATION OF THE ALLOCATION TO  
THE NON-GEOSTATIONARY MOBILE-SATELLITE SERVICE (MSS) IN  
THE METEOROLOGICAL AIDS BAND 405 - 406 MHz AND THE  
IMPACT ON PRIMARY SERVICES ALLOCATED IN THE  
ADJACENT BANDS**

The World Radiocommunication Conference (~~Geneva 1997~~Istanbul, 2000),

*considering*

- a) that there is a significant shortfall of spectrum for the non-geostationary (non-GSO) mobile-satellite service (MSS) below 1 GHz, and there is an urgent need to make additional spectrum available on a worldwide basis for such non-GSO MSS systems;
- b) that the Report of the 1999 Conference Preparatory Meeting (CPM-97 99) to ~~this conference~~ WRC-97 2000 states that the Radiocommunication Bureau (BR) has identified ~~23~~ 22 non-GSO MSS networks as of [28 April, 1999], at frequencies below 1 GHz, at some state of coordination under Resolution 46/~~S9.11A~~ of the Radio Regulations, ~~that it is likely that a number of these systems may not be implemented for reasons not connected with spectrum availability and that several administrations have indicated in their information submitted to BR that they plan on implementing these non-GSO MSS systems by the year 2002 or earlier; However, it appears that many of the proposed networks cannot be implemented in the existing allocation because there is not enough spectrum readily available without applying S9.21 to allow the development of all these systems.~~
- e) ~~that the CPM-97 Report for WRC-97 also states that it appears that many of the proposed networks cannot be implemented in the existing allocations because there is not enough spectrum to allow the development of all of these systems in an economically viable manner;~~
- c) that the CPM-99 Report for WRC-2000 described an extensive study carried out by an administration in 1996 which identified a need for spectrum beyond the current allocations, identifying a spectrum requirement for service links of about 17 MHz on a shared basis, and an additional 4 MHz of shared spectrum for feeder links;
- d) that the CPM-99 Report for WRC-2000 also mentioned more recent reports carried out in 1997-1998 which support the estimates made in the 1996 study.
- ~~de)~~ that meteorological aids systems are essential to produce the upper air measurements required by the World Meteorological Organization (WMO), as summarized in Recommendation ITU-R SA.1165, and that systems using the band 400.15 - 406 MHz constitute the majority of the mobile and fixed observation stations worldwide;
- ~~ef)~~ that meteorological aids systems are also essential to produce the upper air measurements required for civilian and other applications;

fg) that the amount of spectrum required by meteorological users, including WMO (station spacing requirement of 250 km), civilian users and other related users, in most geographical areas is about 5 MHz in the band 401 - 406 MHz using the currently employed technology;

~~g) that since this Conference upgraded the allocation to the earth exploration satellite service and the meteorological satellite service to primary in the band 401-403 MHz, this is likely to impose constraints on the meteorological aids service in certain geographical areas;~~

h) that the CPM-99 Report for WRC-2000 stated that in the long term, improved technology and operational techniques may result in more efficient use of the band 401-406 MHz by the existing services, which may enable future review of requirements for this band;

~~h)i)~~ that the development of more spectrum-efficient meteorological aids systems is continuing in order to minimize the bandwidth required by these systems, as outlined in Recommendation SA.1165, and that recent development of these related technologies has been rapid;

~~i)j)~~ that sharing studies to date have shown that co-channel sharing between currently proposed non-GSO MSS systems and meteorological aids in the band 401 - 406 MHz is not generally feasible, that any sharing would require band segmentation and that the band 405 - 406 MHz has been named by some administrations as a possible candidate band for such a new allocation;

~~j)k)~~ that any transition of meteorological aids from the band 405 - 406 MHz should not increase the operational costs of meteorological aids networks beyond the available financial resources, and should not constrain the future development of the meteorological aids service, while using more spectrum-efficient systems;

~~k)l)~~ that the COSPAS-SARSAT system operates within an exclusive allocation in the band 406 - 406.1 MHz, that the radio astronomy service has a primary allocation in the band 406.1 - 410 MHz and that these services need to be protected from MSS transmissions including unwanted emissions,

*noting*

- a) that the possible use of the band 405 - 406 MHz by the mobile-satellite service should be limited to systems using narrow-band modulation techniques until further ITU-R studies conclude that other modulation techniques can protect COSPAS-SARSAT (406 - 406.1 MHz) and the radio astronomy service (406.1 - 410 MHz);
- b) that Resolution **214 (Rev.WRC-97)** also addresses sharing studies relating to consideration of the allocation of bands below 1 GHz to the non-GSO MSS,

*resolves to invite ITU-R*

1. as a matter of urgency, to study improved technology and operational techniques which may result in more efficient use of the band 401-406 MHz by the existing services;

2. as a matter of urgency, upon completion of the studies in *resolves 1*, with the participation of WMO, to assess further the current and future requirements of the meteorological aids service in the band 401 - 406 MHz, taking into account the requirements of the earth exploration-satellite service and the meteorological-satellite service in the band 401 - 403 MHz;

3. as a matter of urgency, upon completion of the studies in *resolves 1*, with the participation of WMO, to consider the possible transition of the meteorological aids service out of the band 405 - 406 MHz, which would minimize the impact on the meteorological aids service, while taking into account requirements for the implementation of non-GSO MSS;

4. to consider, based on the outcome of 1, 2, and 3 above, a possible transition plan, including a transition date at which time meteorological aids could migrate their operations out of the band 405 - 406 MHz and MSS operations could commence,

~~4~~ as a matter of urgency, to study, with the participation of IUCAF and other relevant entities, the impact of unwanted emissions on the COSPAS-SARSAT system in the band 406 - 406.1 MHz and the radio astronomy service in the band 406.1 - 410 MHz, and identify appropriate protection measures for these services;

*resolves*

that the ~~1999~~ 2002/2003 World Radiocommunication Conference (WRC- 99 02/03)/~~a future competent conference~~ be invited to consider, based on the outcome of *resolves to invite ITU-R* above, the possibility of allocating the band 405 - 406 MHz to the mobile-satellite service, including any appropriate transition plan,

*urges administrations*

- 1 to assess their current and future requirements for meteorological aids systems in the band 401 - 406 MHz taking into account the requirements of the earth exploration-satellite service and the meteorological-satellite service in the 401 - 403 MHz band;
- 2 to, either individually or on a subregional or regional basis, report to WMO and ITU-R on whether the whole of the band 401 - 406 MHz will be needed for meteorological aids, and the possibility of transition out of the band 405 - 406 MHz;
- 3 to submit to ITU-R the most up-to-date information on their plans for possible implementation of non-GSO MSS systems and the associated spectrum requirements,

*instructs the Secretary-General*

to bring this Resolution to the attention of WMO.

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**REASON:** To take account of the continuing need for additional spectrum below 1 GHz for non-GSO MSS service links, and to impart a greater sense of urgency to the development of more spectrum-efficient techniques by meteorological aids systems in the band 401-406 MHz.

#### **United States of America**

#### **PROPOSALS FOR THE WORK OF THE CONFERENCE**

#### **Proposal for Agenda Item 7.2**

**(to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent Conference and on possible agenda items for future conferences)**

#### **Background Information:**

It is proposed to add an item to Resolution 722, Preliminary Agenda for the 02/03 World Radiocommunication Conference, to include consideration of non-GSO MSS allocations below 1 GHz, as invited by the modified Resolution 219.

**Proposal:**

USA/z/2

ADD

RESOLUTION 722 (WRC-1997)

**Preliminary Agenda for the 2002/03 World Radiocommunication Conference**

2.1N to consider additional allocations on a worldwide basis for the non-geostationary (non-GSO) MSS below 1 GHz, taking into account the results of ITU-R studies conducted in response to Resolution 219 (WRC-2000);

**Reason:** To include in the WRC-02/03 Agenda the consideration of additional allocations for the non-GSO/MSS as invited by Resolution 219 as revised by WRC-2000.

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**D. Proposals for Agenda Items 4 and 7.2 (WAC/083(24.06.99) / WAC/098(24.06.99))**

**United States of America  
Proposal for the Work of the Conference**

**Proposal for Agenda Item 4**

(in accordance with Resolution 95 (WRC-97), to review the resolutions and recommendations of previous conferences with a view to their possible revision, replacement or abrogation;)

The proposal herein amends Resolution 728: to invite additional studies on feasibility of, and techniques to facilitate, sharing between non-GSO MSS (space-to-Earth) transmissions and digital television systems in the band 470-862 MHz; and to invite WRC-05 to consider the possibility of making additional allocations on a world-wide basis for non-GSO MSS in certain segments of this band.

**Background**

Resolution 728, adopted at WRC-97, resolved in part:

- 1 to invite ITU-R to carry out studies to determine operational and technical means that may facilitate co-frequency sharing between narrow-band non-GSO MSS (space-to-Earth) transmissions and the services to which the band 470 - 862 MHz is allocated, including the bands where the broadcasting service is also allocated,
2. to invite a future competent conference to consider, on the basis of the results of the studies referred to in *resolves* 1, the possibility of making additional allocations on a worldwide basis for non-GSO MSS...

Existing Recommendations of the ITU-R indicate that operation of narrow-band non-GSO MSS transmissions might be feasible at the edges of analogue television channels where the TV signal is least sensitive to interference. However, ITU-R Recommendations have not identified the protection ratios for digital television systems. To the extent that protection ratios for digital television are similar to those for analogue systems, the same conclusions on the feasibility of sharing would apply.

The proposed revision of Res. 728 invites additional study of sharing, including consideration of digital television systems.

The existing Resolution does not identify a specific conference at which additional allocations to non-GSO MSS in the band 470-862 MHz could be considered. If a conference is not designated until after all the necessary studies are completed, there would be a gap of at least four more years before an allocation item could be put on the agenda of a conference. Therefore, it is foresighted and prudent to establish a reasonable future date by which the necessary studies are expected to be completed.

The proposed revision of Res. 728 invites WRC-05, a Conference that would convene five years after the adoption of the revised Resolution calling for additional studies, to consider such additional allocations. In view of the current plans for the rapid design, development, testing, and installation of digital television systems, it is likely that the results of such studies would be available in time for consideration by WRC-05.

**PRELIMINARY VIEW:** The feasibility of MSS sharing with broadcasting and other radiocommunications services in this band requires further study in the ITU-R. Based on these results, the US will determine whether to pursue MSS allocations in this band.

**PROPOSAL:** The proposed revision of Resolution 728 and the Reason for its revision are given in the Annex.

The proposed revision of Resolution 728 for allocations at WRC-2005 would require WRC-2000 recommend to the Council an additional agenda item for WRC-2005 under agenda item 7.2. This new agenda item should read: “additional allocations on a worldwide basis for the non-GSO MSS with service links operating below 1 GHz in accordance with Resolution 728”.

ANNEX

USA/Y/1

MOD

RESOLUTION 728 (WRC-97 2000)

**STUDIES RELATING TO CONSIDERATION OF ALLOCATIONS IN THE  
BROADCASTING BAND 470 - 862 MHz TO NON-GEOSTATIONARY  
MOBILE-SATELLITE SERVICES**

The World Radiocommunication Conference (~~Geneva, 1997~~ Istanbul, 2000),

*considering*

- a) that the agenda of this Conference included consideration of the adoption of additional allocations for non-geostationary mobile-satellite services (non-GSO MSS);
- b) that the Report of the 1999 Conference Preparatory Meeting (CPM-99) stated that the Radiocommunication Bureau has identified at least ~~[23 22]~~, non-GSO MSS networks [as of 28 April, 1999] at frequencies below 1 GHz, at some state of coordination under Resolution 46, and that many of the proposed networks cannot be implemented in the existing allocations because there is not enough spectrum;
- c) that CPM-97 considered the protection requirements for analogue television in the band 470 - 862 MHz against a narrow-band MSS signal in the most sensitive and least sensitive portions of an analogue television channel and the protection requirements for a digital television channel, based on existing ITU-R Recommendations (BT.655-4, BT.417-4 and IS.851-1);
- d) that CPM-97 stated that the protection ratios for a narrow-band interfering signal in the least sensitive parts of an analogue television channel are to be verified by further studies;
- e) that CPM-97 stated the region of lower protection requirements and commensurately higher permissible interfering power flux-density levels as being 100 kHz from the band edges of an analogue television channel, at least in some countries;
- f) that CPM-97 stated that the interfering effects of a non-GSO MSS transmission will depend on its specific characteristics (e.g. duty-cycle, duration, periodicity, etc.), that interference contributions from sources other than MSS (even those from other broadcasting stations) have to be taken into account, that slightly lower values of field strength to be protected may need to be assumed in countries where television networks are relatively sparse, and that studies on sharing are necessary;
- g) that the permissible aggregate interfering power flux-density resulting from these protection requirements, in some portions of an analogue television channel, may be useful in determining the feasibility of sharing with non-GSO MSS transmitter space-to-Earth links;
- h) that these bands are also allocated in part to fixed and mobile terrestrial systems and radionavigation systems;
- i) that, in many countries, the channels assigned for analogue television may also be used for digital television, and that during the period of parallel operation of analogue and digital television networks the

usage of this band for television will increase,

*noting*

- a) that on completion of studies, parts of the bands now allocated to the broadcasting service between 470 MHz and 862 MHz might be considered suitable for worldwide allocation to non-GSO MSS space-to-Earth transmissions;
- b) that the bandwidth required in these television channels may be 1-2% of the total band 470 - 862 MHz to be shared with the above systems;
- c) the need to protect the radio astronomy service in the band 608 - 614 MHz against interference from MSS transmissions, including unwanted emissions,

*resolves*

- 1 to invite ITU-R to carry out additional studies to determine operational and technical means that may facilitate co-frequency sharing between narrow-band non-GSO MSS (space-to-Earth) transmissions and the services to which the band 470 - 862 MHz is allocated, including the bands where the broadcasting service is also allocated, and including consideration of digital television systems;
- 2 to invite ~~a future competent conference~~ WRC-05 to consider, on the basis of the results of the studies referred to in *resolves* 1, the possibility of making additional allocations on a worldwide basis for non-GSO MSS, taking into account, in particular, *considering* h) and i) above,

*urges administrations*

to participate actively in such studies, with the involvement of interested parties.

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**REASON:** To extend the mandate of Resolution 728 to consideration of allocations at WRC-05, by which time studies can be completed based on the additional guidance of WRC-2000, and taking into account the interference and sharing criteria of digital TV broadcasting systems.

**United States of America**  
**PROPOSALS FOR THE WORK OF THE CONFERENCE**  
**Proposal for Agenda Item 7.2**

(to recommend to the Council items for inclusion in the agenda for the next WRC, and to give its views on the preliminary agenda for the subsequent Conference and on possible agenda items for future conferences)

**Background Information:**

It is proposed to recommend to the Council an agenda item for WRC-2005 that would consider additional allocations on a worldwide basis for the non-GSO MSS with service links operating below 1 GHz in accordance with modified Resolution 728.

**Proposal:**

USA/y/2

ADD

RESOLUTION ZZZ (WRC-2000)

**Preliminary Agenda for the 2005 World Radiocommunication Conference**

2.AA to consider additional allocations on a worldwide basis for the non-GSO/MSS below 1 GHz with service links operating below 1 GHz in accordance with Resolution 728;

**Reason:** To include in the WRC-05 Preliminary Agenda the consideration of additional allocations for the non-GSO/MSS as invited by Resolution 728 (Rev. WRC-2000).

**III. Draft Proposals of IWG-4 (Informal Working Group on NGSO Fixed-Satellite Service  
(including consideration of Art. S21 and S22 PFD Limits)**

**A. Proposal 1 - Draft United States Proposal for Agenda Item 1.13.1 in  
Response to Resolution 131 (WRC-97) Regarding pfd Limits for  
Non-Geostationary Satellites Operating in the Bands 10.7 – 12.75 GHz and  
17.7 – 19.3 GHz for the Protection of the Fixed Service (WAC/108(24.06.99))**

United States of America

**[DRAFT] PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Proposal for Agenda Item 1.13.1 in Response to Resolution 131 (WRC-97)**

- 1.13 on the basis of the results of the studies in accordance with Resolutions **130 (WRC-97)**, **131 (WRC-97)** and **538 (WRC-97)**:
- 1.13.1 to review and, if appropriate, revise the power limits appearing in Articles **S21** and **S22** in relation to the sharing conditions among non-GSO FSS, GSO FSS, GSO broadcasting-satellite service (BSS), space sciences and terrestrial services, to ensure the feasibility of these power limits and that these limits do not impose undue constraints on the development of these systems and services;

**Background Information:**

Resolution 131 (WRC-97) *invited ITU-R* “to study, as a matter of urgency, the appropriate power flux-density values to be applied to non-GSO networks in the bands 10.7 – 12.75 GHz and 17.7 – 19.3 GHz to ensure protection of the fixed service without unduly constraining the development of either type of network.” **RES131 requested WRC-00** “to review the provisional pfd limits referred to in *resolves* 1 (of RES131) based on the results of the studies carried out by ITU-R.” The ITU-R has confirmed the limits in the band 10.7 – 12.75 GHz and determined a new set of limits to replace the provisional limits established by WRC-97 in 17.7 – 19.3 GHz.

**Proposal:**

USA/x/nnn

**MOD****TABLE S21-4**

Frequency band	Service*	Limit in dB(W/m <sup>2</sup> ) for angle of arrival ( $\delta$ ) above the horizontal plane			Reference
		0°-5°	5°-25°	25°-90°	Bandwidth
10.7-11.7 GHz	Fixed-satellite (space-to-Earth) , geostationary-satellite orbit	$-150^{14}$	$-150 + 0.5(\delta - 5)^{14}$	$-140^{14}$	4 kHz
<u>10.7-11.7 GHz</u>	<u>Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit</u>	<u>-126</u>	<u><math>-126 + 0.5(\delta - 5)</math></u>	<u>-116</u>	<u>1 MHz</u>
11.7-12.5 GHz (Regions 1 and 3) 12.5-12.75 GHz (Region 1 and Region 3 countries listed in Nos. <b>S5.494</b> and <b>S5.496</b> ) <del>11.7-12.72 GHz (Region 2)</del> <del>11.7-12.2 GHz (Region 3)</del> <del>12.2-12.7 GHz (Region 2)</del>	Fixed-satellite (space-to-Earth), non-geostationary-satellite orbit	<del><math>-148^{14}</math></del> <u>-124</u>	<del><math>-148 + 0.5(\delta - 5)^{14}</math></del> <u><math>-124 + 0.5(\delta - 5)</math></u>	<del><math>-138^{14}</math></del> <u>-114</u>	<del>4 kHz</del> <u>1 MHz</u>
12.2-12.5 GHz <sup>7</sup> (Region 3) 12.5-12.75 GHz <sup>7</sup> (Region 1 and Region 3 countries listed in Nos. <b>S5.494</b> and <b>S5.496</b> )	Fixed-satellite (space-to-Earth), <u>geostationary-satellite orbit</u>	$-148^{14}$	$-148 + 0.5(\delta - 5)^{14}$	$-138^{14}$	4 kHz
17.7-19.3 GHz <sup>7,8</sup>	Fixed-satellite (space-to-Earth) Meteorological-satellite (space-to-Earth)	$-115^{aa}$ or $-125$ <u><math>-115 - \frac{X}{X}^{12}</math></u>	$-115 + 0.5(\delta - 5)^{aa}$ or $-125 + (\delta - 5)$ <u><math>-115 - X + ((10 + X)/20)(\delta - 5)^{12}</math></u>	$-105^{aa}$ or $-105^{12}$	1 MHz

ADD<sup>aa</sup> S21.16.6bis

These limits apply to emissions of space stations on meteorological-satellites and on geostationary FSS satellites. These limits also apply to emissions of space stations on non-geostationary FSS satellites which were in operation or for which complete coordination or notification information had been received by the Radiocommunication Bureau: by 17 November 1995, in the bands 18.8-19.3 GHz; or by 22 November 1997, in the bands 17.7-18.8 GHz.

MOD<sup>12</sup>  
S21.16.6

~~These values shall apply provisionally only to emissions of space stations on non-geostationary satellites in networks operating with a large number of satellites, that is systems operating with more than 100 satellites (see Resolution 131 (WRC-97)).~~ These limits apply only to emissions of space stations on non-geostationary FSS satellites for which complete coordination or notification information has been received by the Radiocommunication Bureau after 17 November 1995 in the bands 18.8-19.3 GHz or after 22 November 1997 in the bands 17.7-18.8 GHz. The function X is defined as a function of the number, N, of satellites in the non-GSO FSS constellation as follows:

– for  $N \leq 50$   $X = 0$  (dB)

– for  $50 < N \leq 288$   $X = \frac{5}{119}(N - 50)$  (dB)

– for  $N > 288$   $X = \frac{1}{69}(N + 402)$  (dB) (WRC-00)

SUP<sup>14</sup> S21.16.8

SUP<sup>15</sup> S21.16.9

SUP RES131

~~RESOLUTION 131 (WRC-97)~~

**~~Power flux-density limits applicable to non-geostationary fixed-satellite service systems for protection of terrestrial services in the bands 10.7-12.75 GHz and 17.7-19.3 GHz~~**

#### Reasons:

This Proposal replaces the provisional pfd limits in Table S21-4 with the values that, as a result of extensive ITU-R studies, were agreed by WP 4-9S and JTG 4-9-11. ADD<sup>aa</sup> S21.16.6bis, and a corresponding change in MOD<sup>12</sup> S21.16.6, specify the dates of application of the pfd limits in conformance with the dates established in RES131. S21.16.8, S21.16.9, and RES131 are no longer required.

**B. Proposal 2 (WAC/109(24.06.99))**

**United States of America**  
**[DRAFT] Proposals for Agenda Item 1.13.1**

To review and, if appropriate, revise the power limits appearing in Articles S21 and S22 in relation to the sharing conditions among non-GSO FSS, GSO FSS, GSO broadcasting satellite service (BSS), space services, and terrestrial services, to ensure the feasibility of these power limits and that these limits do not impose undue constraints on the development of these systems and services.

**Background**

The report of CPM-99 to WRC-2000 states that “[t]here is a need to provide a regulatory mechanism that would ensure protection of GSO FSS and GSO BSS networks from the maximum aggregate equivalent power flux-density produced by multiple non-GSO FSS systems in frequency bands where equivalent power flux-density (EPFD) limits have been adopted.” CPM-99 Report at Section 3.1.1.3.2. With respect specifically to the GSO BSS, Section 3.1.3.1.4(b) of the CPM-99 Report to WRC-2000 states that “[t]here is a need to ensure that the aggregate EPFD produced by all co-frequency non-GSO FSS systems does not exceed the maximum interference levels, as determined by the agreed to aggregate EPFD masks, that are necessary to protect these GSO BSS systems.”

The United States strongly agrees with these assessments, and believes that the required regulatory mechanism can only be provided in the form of aggregate limits that are included in Article **S22** or attached to a WRC-2000 Resolution. Because a WRC-2000 Resolution would be an acceptable mechanism, the United States proposes the Resolution included in the attachment, which is based in substantial part on studies performed in the ITU-R.

**Proposals**

**1. USA/1.13.1/4**

RESOLUTION WWW (WRC-2000)

**PROTECTION OF GSO FSS AND GSO BSS NETWORKS FROM THE MAXIMUM AGGREGATE  
EQUIVALENT POWER FLUX-DENSITY PRODUCED BY MULTIPLE NON-GSO FSS SYSTEMS IN  
FREQUENCY BANDS WHERE EPFD LIMITS HAVE BEEN ADOPTED**

The World Radiocommunication Conference (WRC-2000, Istanbul),

*considering*

- a) that WRC-97 has adopted, in Article **S22**, provisional EPFD limits to be met by non-GSO FSS systems in order to protect GSO FSS and GSO BSS networks in parts of the frequency range 10.7 - 30 GHz;
- b) that WRC-2000 has revised these limits to ensure that they provide adequate protection to

GSO systems without causing undue constraints to any of the systems and services sharing these frequency bands;

- c) that Article **S22** includes single entry EPFD limits which apply to non-GSO FSS systems in these bands;
- d) that these single-entry limits have been derived from aggregate equivalent power flux-density (EPFD) masks that are intended to protect GSO networks, assuming a maximum effective number of non-GSO FSS systems of 3.5;
- e) that the aggregate interference caused by all co-frequency non-GSO FSS systems in these bands into GSO FSS systems should not exceed the maximum interference levels that are necessary to protect these GSO systems;
- f) that WRC-97 decided, and WRC-2000 confirmed, that non-GSO FSS systems in these bands are to coordinate the use of these frequencies between themselves under the provisions of No. **S9.12** of the Radio Regulations;
- g) that the orbital characteristics of such systems are likely to be inhomogeneous;
- h) that as a result of this likely inhomogeneity, the aggregate EPFD levels from multiple non-GSO FSS systems are not directly related to the number of actual systems sharing a frequency band, and the number of such systems operating co-frequency is likely to be small,

*recognizing*

- a) that non-GSO FSS systems are likely to need to implement interference mitigation techniques to share frequencies among themselves;
- b) that because the use of such interference mitigation techniques will likely keep the number of non-GSO systems small, the aggregate interference caused by non-GSO FSS systems into GSO systems will also likely be small;
- d) that notwithstanding *considering* d), there may be instances where the aggregate interference from non-GSO systems could exceed the interference levels given in Annex 1;
- e) that administrations operating GSO systems may wish to ensure that the aggregate EPFD produced by all operating co-frequency non-GSO FSS systems in the frequency bands referred to in *considering* a) above into GSO FSS and/or GSO BSS networks does not exceed the aggregate interference levels given in Annex 1,

*resolves*

- 1 that administrations operating or planning to operate non-GSO FSS systems in the frequency bands referred to in *considering* a) above, individually or in collaboration, take all

possible steps, including by means of appropriate modifications to their systems if necessary, to ensure that the actual aggregate interference into GSO FSS and GSO BSS networks caused by such systems operating co-frequency in these frequency bands does not exceed the aggregate power levels shown in Annex 1;

2 that, in the event that the aggregate interference levels in Annex 1 are exceeded into an operational GSO earth station, administrations operating non-GSO FSS systems in these frequency bands shall expeditiously take all necessary measures to reduce the aggregate EPFD levels to those in Annex 1 or to reduce such interference to higher levels that are acceptable to the affected GSO administration,

*requests ITU-R*

1 to develop, as a matter of urgency, and complete, in time for consideration by the next WRC, a methodology for calculating the aggregate EPFD produced by all non-GSO FSS systems operating or planning to operate co-frequency in the frequency bands referred to in *considering a)* above into GSO FSS and GSO BSS networks and for comparing the calculated levels with the aggregate power levels shown in Annex 1;

2 to continue its studies on the accurate modelling of interference from non-GSO FSS systems into GSO FSS and GSO BSS networks in the frequency bands referred to in *considering a)* above in order to assist the administrations planning or operating non-GSO FSS systems in their efforts to limit the aggregate EPFD levels produced by their systems into GSO networks,

*requests the Director of the Radiocommunication Bureau*

to assist in the development of the methodology referred to in *requests ITU-R 1* above.

# ANNEX 1 (TO RESOLUTION WWW)

This Annex to Resolution WWW contains tables of interference levels concerning aggregate interference from multiple non-GSO FSS systems into GSO FSS and GSO BSS systems.

**TABLE 1A-FSS <sup>1</sup>**

**Limits to the aggregate EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands**

Frequency band (GHz)	EPFD <sub>down</sub> dB(W/m <sup>2</sup> )	Percentage of time during which EPFD <sub>down</sub> may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern <sup>2</sup>
10.7 – 11.7; 11.7 – 12.2 in Region 2; 12.2 – 12.5 in Region 3 and 12.5 – 12.75 in Regions 1 and 3	-170.0	0	40	60 cm Rec. S.[4/57]
	-168.6	90		
	-165.3	99		
	-160.4	99.97		
	-160.0	99.99		
	-160.0	100		
	-176.5	0	40	1.2 m Rec. S.[4/57]
	-173.0	99.5		
	-164.0	99.84		
	-161.6	99.945		
	-161.4	99.97		
	-160.8	99.99		
	-160.5	99.99		
	-160	99.9975		
	-160	100		
	-185.0	0	40	3 m Rec. S.[4/57]
	-184.0	90		
	-182.5	99.1		
	-160	99.999		
	-160	100		
	-190.0	0	40	10 m Rec. S.[4/57]
	-190.0	99.9		
	-163.0	99.999		
	-163.0	100		

<sup>1</sup> For certain receive earth stations, see also ADD **S9.7A** and ADD **S9.7B**.

<sup>2</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

**Editorial Note to Table 1A-FSS:** The US proposal included in Table 1A-FSS for the 3 meter and 10 meter antenna diameters reflect in tabular form Curve B from Figures 1 and 2, respectively, in Section 3.1.2.1.4(c) of the draft CPM Report. An alternative set of curves (Curve A from Figures 1 and 2, respectively), is also included in Section 3.1.2.1.4(c) in the draft CPM Report. A set of values based on the alternative set of curves, which is not supported by the US, is provided in tabular form below:

<b>Frequency band (GHz)</b>	<b>EPFD<sub>down</sub> dB(W/m<sup>2</sup>)</b>	<b>Percentage of time during which EPFD<sub>down</sub> may not be exceeded</b>	<b>Reference bandwidth (kHz)</b>	<b>Reference antenna diameter, and reference radiation pattern<sup>2</sup></b>
10.7 – 11.7; 11.7 – 12.2 in Region 2; 12.2 – 12.5 in Region 3 and 12.5 – 12.75 in Regions 1 and 3	-185	0	40	3 m Rec. S.[4/57]
	-184	90		
	-182.5	99		
	-182	99.5		
	-168	99.9		
	-164	99.96		
	-161.8	99.985		
	-160	99.997		
	-160	100		
	-190	0	40	10 m Rec. S.[4/57]
	-190	99		
	-166	99.991		
	-160	99.998		
	-160	100		

No agreement was reached within the ITU-R and work is continuing in an effort to reach a compromise between the two sets of limits, or to agree on other mutually acceptable solutions.

**TABLE 1B-FSS <sup>1</sup>**

**Limits to the aggregate EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands**

<b>Frequency Band (GHz)</b>	<b>Epfd<sub>down</sub> dB(W/m<sup>2</sup>)</b>	<b>Percentage of time during which Epfd<sub>down</sub> may not be exceeded</b>	<b>Reference Bandwidth (kHz)</b>	<b>Reference antenna diameter, and reference radiation pattern <sup>2</sup></b>
17.8-18.6	-170	0	40 <sup>3</sup>	1 m Rec. S.[4/57]
	-170	90		
	-164	99.9		
	-164	100		
17.8-18.6	-173	0	40 <sup>3</sup>	2 m Rec. S.[4/57]
	-173	99.4		
	-166	99.9		
	-164	99.92		
	-164	100		

17.8-18.6	-180	0	40 <sup>3</sup>	5 m Rec. S.[4/57]
	-180	99.8		
	-172	99.8		
	-164	99.992		
	-164	100		

<sup>1</sup> For certain receive earth stations, see also ADD **S9.7A** and ADD **S9.7B**.

<sup>2</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

<sup>3</sup> For non-GSO emission bandwidths greater than 40 kHz, the  $epfd_{down}$  limits may be scaled by adding  $10 \log(\text{non-GSO emission bandwidth} / 40 \text{ kHz})$  in a reference bandwidth equal to the emission bandwidth.

**TABLE 1C-FSS<sup>1</sup>**

**Limits to the aggregate EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands**

<b>Frequency Band (GHz)</b>	<b>Epfd<sub>down</sub> dB(W/m<sup>2</sup>)</b>	<b>Percentage of time during which Epfd<sub>down</sub> may not be exceeded</b>	<b>Reference Bandwidth (kHz)</b>	<b>Reference antenna diameter, and reference radiation pattern<sup>2</sup></b>
19.7-20.2	-182	0	40 <sup>3</sup>	70 cm Rec. S.[4/57]
	-172	90		
	-154	99.94		
	-154	100		
19.7-20.2	-185	0	40 <sup>3</sup>	90 cm Rec. S.[4/57]
	-176	91		
	-165	99.8		
	-160	99.8		
	-154	99.99		
	-154	100		
19.7-20.2	-193	0	40 <sup>3</sup>	2.5 m Rec. S.[4/57]
	-185	90		
	-166	99.99		
	-160	99.99		
	-154	99.998		
	-154	100		

<sup>1</sup> For certain receive earth stations, see also ADD **S9.7A** and ADD **S9.7B**.

<sup>2</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

<sup>3</sup> For non-GSO emission bandwidths greater than 40kHz, the  $epfd_{down}$  limits may be scaled by adding  $10 \log(\text{non-GSO emission bandwidth} / 40 \text{ kHz})$  in a reference bandwidth equal to the

emission bandwidth.

**Editorial Note to Table 1C-FSS:** The table below contains the aggregate  $EPFD_{down}$  masks for the 2.5 and 5 meter antennas in the 19.7-20.2 GHz band supported by the majority of participants at the final JTG 4-9-11 meeting and included in the draft CPM Report.

<b>Frequency band (GHz)</b>	<b><math>EPFD_{down}</math> dB(W/m<sup>2</sup>)</b>	<b>Percentage of time during which <math>EPFD_{down}</math> may not be exceeded</b>	<b>Reference bandwidth (kHz)</b>	<b>Reference antenna diameter, and reference radiation pattern<sup>2</sup></b>
19.7-20.2	-191 -154.35 -154.35	0 99.99 100	40	2.5 m Rec. S.[4/57]
19.7-20.2	-195 -184 -175 -154.35 -154.35	0 90 99.6 99.996 100	40	5 m Rec. S [4/57]

Due to the late introduction of this proposal, nearing the end of the meeting, the U.S. was unable to agree to these masks. Nevertheless, the U.S. is continuing to work towards resolving the differences between the two masks for the 2.5 meter antenna. It is noted that the U.S. does not currently see the need for an  $EPFD_{down}$  mask for the 5 meter antenna diameter in this band, and is of the view that the final 2.5 meter mask should also protect antenna sizes up to 3.5 meters

**TABLE 1D-BSS**

**Limits to the aggregate EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands**

**30cm, 45cm, and 60cm BSS antennas**

<b>Frequency band (GHz)</b>	<b>Epfd<sub>down</sub> dB(W/m<sup>2</sup>)</b>	<b>Percentage of time during which Epfd<sub>down</sub> may not be exceeded</b>	<b>Reference bandwidth (kHz)</b>	<b>Reference antenna diameter, and reference radiation pattern <sup>1</sup></b>
11.7 – 12.5 GHz In Region 1 11.7 – 12.2 GHz and 12.5 – 12.75 GHz In Region 3 12.2 – 12.7 GHz In Region 2	-160.400 -160.100 -158.600 -158.600 -158.330 -158.330	0.000 25.000 96.000 98.000 98.000 100.000	40	30 cm DNR ITU-R BO.[Doc. 11/137 Annex 1]
11.7 – 12.5 GHz In Region 1 11.7 – 12.2 GHz and 12.5 – 12.75 GHz In Region 3 12.2 – 12.7 GHz In Region 2	-170.000 -167.000 -164.000 -160.750 -160.750 -160.000 -159.900	0.000 66.000 97.750 99.330 99.330 99.950 100.000	40	45 cm DNR ITU-R BO.[Doc. 11/137 Annex 1]
11.7 – 12.5 GHz In Region 1 11.7 – 12.2 GHz and 12.5 – 12.75 GHz In Region 3 12.2 – 12.7 GHz In Region 2	-171.000 -168.750 -167.750 -162.000 -161.000 -160.200 -160.000 -159.900	0.000 90.000 97.800 99.600 99.800 99.900 99.990 100.000	40	60 cm DNR ITU-R BO. [Doc. 11/137 Annex 1]

<sup>1</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

**TABLE 1E-BSS**

**Limits to the aggregate EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands**

**90cm and 120cm BSS antennas**

<b>Frequency band (GHz)</b>	<b>Epfd<sub>down</sub> dB(W/m<sup>2</sup>)</b>	<b>Percentage of time during which Epfd<sub>down</sub> may not be exceeded</b>	<b>Reference bandwidth (kHz)</b>	<b>Reference antenna diameter, and reference radiation pattern <sup>1</sup></b>
11.7 – 12.5 GHz In Region 1 11.7 – 12.2 GHz and 12.5 – 12.75 GHz In Region 3 12.2 – 12.7 GHz In Region 2	-173.75 -173 -171 -165.5  -163  -161 -160 -159.9	0.000 33.000 98.000 99.100  99.500  99.800 99.970 100.000	40	90 cm DNR ITU-R BO. [Doc. 11/137 Annex 1]
11.7 – 12.5 GHz In Region 1 11.7 – 12.2 GHz and 12.5 – 12.75 GHz In Region 3 12.2 – 12.7 GHz In Region 2	-177.000 -175.250 -173.750 -173.000 -169.500  -167.800  -164.000 -161.900 -161.000 -160.400 -159.900	0.000 90.000 98.900 98.900 99.500  99.700  99.820 99.900 99.965 99.993 100	40	120 cm DNR ITU-R BO. [Doc. 11/137 Annex 1]

<sup>1</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

**TABLE 1F-BSS**  
**Limits to the aggregate EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands**

**180cm and 240cm BSS antennas**

Frequency band (GHz)	Epfd <sub>down</sub> dB(W/m <sup>2</sup> )	Percentage of time during which Epfd <sub>down</sub> may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern <sup>1</sup>
11.7 – 12.5 GHz In Region 1	-192.8	0	4	180 cm DNR ITU-R BO. [Doc. 11/137 Annex 1]
11.7 – 12.2 GHz	-192.8	96.06		
and	-188	98.37		
12.5 – 12.75 GHz	-185	99.06		
In Region 3	-182	99.46		
12.2 – 12.7 GHz	-178.8	99.7		
In Region 2	-178.8	100		
11.7 – 12.5 GHz	-195	0	4	240 cm DNR ITU-R BO. [Doc. 11/137 Annex 1]
In Region 1	-195	99.24		
11.7 – 12.2 GHz	-193	99.48		
and	-190	99.70		
12.5 – 12.75 GHz	-187	99.83		
In Region 3	-184	99.9		
12.2 – 12.7 GHz	-184	100		
In Region 2				

<sup>1</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

**Editorial Note to Table 1F-BSS:** Recognizing the work performed to date by the ITU-R and the masks included in Chapter 3 of the CPM Report, further analysis is being conducted on the proposed BSS EPFD<sub>down</sub> masks for the 180 cm and 240 cm antenna sizes. For example, the possibility of a latitude dependent EPFD<sub>down</sub> level for 100 percent of the time is under study with a view to relaxing the 100% EPFD<sub>down</sub> level of the U.S. proposed masks in Table 1F-BSS.

**Reasons:** The ITU-R has determined that it is necessary to provide a regulatory mechanism that ensures the protection of GSO FSS and GSO BSS networks from the maximum aggregate equivalent power flux-density produced by multiple non-GSO FSS systems in frequency bands where EPFD limits have been adopted. The foregoing Resolution, which is in the form of the example resolution suggested by CPM-99-2, is the only such regulatory mechanism other than inclusion of the aggregate EPFD limits in Article S22 that would provide the necessary protection of GSO FSS and GSO BSS networks.

**C. Proposal 3 (WAC/110(24.06.99))**

**United States of America  
[DRAFT] Proposals for Agenda Item 1.13.1**

To review and, if appropriate, revise the power limits appearing in Articles S21 and S22 in relation to the sharing conditions among non-GSO FSS, GSO FSS, GSO broadcasting satellite service (BSS), space services, and terrestrial services, to ensure the feasibility of these power limits and that these limits do not impose undue constraints on the development of these systems and services.

**Background**

Resolution 130 (WRC-97) and Resolution 538 (WRC-97) each requested the ITU-R to conduct (a) “appropriate technical, operational and regulatory studies” to review the regulatory conditions relating to the coexistence of non-GSO FSS and GSO FSS and GSO BSS systems, in order to ensure that undue constraints are not placed on the development of non-GSO FSS, GSO FSS and GSO BSS systems, and (b) the development of a methodology for calculating the power levels produced by non-GSO FSS systems and the compliance of these levels with the applicable limits established pursuant to Resolutions 130 and 538.

Joint Task Group 4-9-11 was established by the ITU-R to pursue these mandates and to determine the necessary technical bases. Taking into account the work of the ITU-R on this matter, the United States makes the following proposals for **Section II** of Article **S22**.

## **Proposals:**

### **1. USA/1.13.1/1**

#### **SUP S22.5B, S22.5C, S22.5D, S22.5E, and S22.5F**

**Reasons:** Proposed Sections **ADD S22.5B, ADD S22.5C, ADD S22.5D, ADD S22.5E, ADD S22.5F, ADD S22.5G, and ADD S22.5H** below, which are based in substantial part on work that has been performed in the ITU-R since WRC-97 established current **Nos. S22.5B, S22.5C, S22.5D, S22.5E, and S22.5F** are intended to be a package that would replace and supplement the current provisions of much of Section II of Article **S22**.

### **2. USA/1.13.1/2**

#### **NOC S22.2, S22.3, S22.4, S22.5, S22.5A**

**Reasons:** These provisions are not directly affected by the review of the EPFD limits that was carried out pursuant to Resolution 130, and should remain unchanged.

### **3. USA/1.13.1/3**

#### **ADD S22.5B, S22.5C, S22.5D, S22.5E, S22.5F, S22.5G, and S22.5H**

**Reasons:** These provisions, which are based in substantial part on the studies carried out by the ITU-R pursuant to Resolution 130, are intended to replace in their entirety the existing Regulations currently found in **Nos. S22.5B to S22.5F**, inclusive. The application of EPFD<sub>up</sub> limits as per Table S22-2 is specifically limited to the bands specified in that table.

**ADD S22.5B**      § 5      1)      The equivalent power flux-density<sup>xx</sup>, EPFD<sub>down</sub>, at any point on the Earth's surface visible from the geostationary-satellite orbit, produced by emissions from all the space stations of a non-geostationary-satellite system in the fixed-satellite service in the frequency bands listed in Tables **S22-1A** through **S22-1F**, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limits given in Tables **S22-1A** through **S22-1F** for the given percentages of time. These limits relate to the equivalent power flux-density which would be obtained under free-space propagation conditions, into a reference antenna and in the reference bandwidth specified in Tables **S22-1A** through **S22-1F**, for all pointing directions towards the geostationary-satellite orbit.

**xx ADD S22.5B.1**

The equivalent power flux-density is defined as the sum of the power flux-densities produced at a GSO receive station on the Earth's surface or in the geostationary orbit, as appropriate, by all the transmit stations within a non-geostationary-satellite system, taking into account the off-axis discrimination of a reference receiving antenna assumed to be pointing in its nominal direction. The equivalent power flux-density is calculated using the following formula:

$$EPFD = 10 \cdot \log_{10} \left[ \sum_{i=1}^{N_a} 10^{\frac{P_i}{10}} \cdot \frac{G_t(q_i)}{4\pi d_i^2} \cdot \frac{G_r(f_i)}{G_{r, \max}} \right]$$

where:

- $N_a$  is the number of transmit stations in the non-geostationary-satellite system that are visible from the GSO receive station considered on the Earth's surface or in the geostationary orbit, as appropriate
- $i$  is the index of the transmit station considered in the non-geostationary-satellite system
- $P_i$  is the RF power at the input of the antenna of the transmit station, considered in the non-geostationary satellite system in dBW in the reference bandwidth
- $q_i$  is the off-axis angle between the boresight of the transmit station considered in the non-geostationary satellite system and the direction of the GSO receive station
- $G_t(q_i)$  is the transmit antenna gain (as a ratio) of the station considered in the non-geostationary satellite system in the direction of the GSO receive station
- $d_i$  is the distance in metres between the transmit station considered in the non-geostationary satellite system and the GSO receive station
- $f_i$  is the off-axis angle between the boresight of the antenna of the GSO receive station and the direction of the  $i$ th transmit station considered in the non-geostationary satellite system
- $G_r(f_i)$  is the receive antenna gain (as a ratio) of the GSO receive station in the direction of the  $i$ th transmit station considered in the non-geostationary satellite system
- $G_{r, \max}$  is the maximum gain (as a ratio) of the antenna of the GSO receive station
- $EPFD$  is the computed equivalent power flux-density in dB(W/m<sup>2</sup>) in the reference bandwidth

# ADD TABLE S22-1A<sup>1</sup>

## Limits to the EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands

Frequency band (GHz)	EPFD <sub>down</sub> dB(W/m <sup>2</sup> )	Percentage of time during which EPFD <sub>down</sub> may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern <sup>2</sup>
10.7 - 11.7; 11.7 - 12.2 in Region 2; 12.2 - 12.5 in Region 3 and 12.5 - 12.75 in Regions 1 and 3	-175.4	0	40	60 cm Rec. S.[4/57]
	-174.0	90		
	-170.8	99		
	-165.3	99.73		
	-160.4	99.991		
	-160.0	99.997		
	-160.0	100		
	-181.9	0	40	1.2 m Rec. S.[4/57]
	-178.4	99.5		
	-173.4	99.74		
	-173.0	99.857		
	-164.0	99.954		
	-161.6	99.984		
	-161.4	99.991		
	-160.8	99.997		
	-160.5	99.997		
	-160.0	99.9993		
	-160.0	100		
	-190.4	0	40	3 m Rec. S.[4/57]
	-189.4	90		
	-188.0	99		
	-182.5	99.743		
	-160.0	99.9997		
	-160.0	100		
	-195.4	0	40	10 m Rec. S.[4/57]
	-195.4	99.9		
	-190	99.96		
	-190	99.971		
	-163	99.9997		
	-163	100		

<sup>1</sup> For certain receive earth stations, see also ADD S9.7A and ADD S9.7B.

- 3 Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

**Editorial Note to Table S22-1A:** The US proposal included in Table S22-1A for the 3 meter and 10 meter antenna diameters reflects in tabular form single-entry values derived from Curve B from Figures 1 and 2, respectively, in Section 3.1.2.1.4(c) of the draft CPM Report. An alternative set of curves (Curve A from Figures 1 and 2, respectively), is also included in Section 3.1.2.1.4(c) in the draft CPM Report. A set of single entry values based on the alternative set of curves, which is not supported by the US, is provided in tabular form below:

<b>Frequency band (GHz)</b>	<b>EPFD<sub>down</sub> dB(W/m<sup>2</sup>)</b>	<b>Percentage of time during which EPFD<sub>down</sub> may not be exceeded</b>	<b>Reference bandwidth (kHz)</b>	<b>Reference antenna diameter, and reference radiation pattern<sup>2</sup></b>
10.7 – 11.7; 11.7 – 12.2 in Region 2; 12.2 – 12.5 in Region 3 and 12.5 – 12.75 in Regions 1 and 3	-190.4	0	40	3 m Rec. S.[4/57]
	-189.4	90		
	-187.9	99		
	-187.4	99.5		
	-182.4	99.725		
	-182	99.857		
	-168	99.971		
	-164	99.989		
	-161.8	99.9957	40	10 m Rec. S.[4/57]
	-160	99.9991		
	-160	100		
	-195.4	0		
	-195.4	99		
	-190	99.65		
	-190	99.714		
	-173	99.99		
	-160	99.999		
	-160	100		

No agreement was reached within the ITU-R and work is continuing in an effort to reach a compromise between the two sets of limits, or to agree on other mutually acceptable solutions.

**ADD TABLE S22-1B<sup>1</sup>**  
**Limits to the EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands**

Frequency Band (GHz)	EPFD <sub>down</sub> dB(W/m <sup>2</sup> )	Percentage of time during which EPFD <sub>down</sub> may not be exceeded	Reference Bandwidth (kHz)	Reference antenna diameter, and reference pattern <sup>2</sup>
17.8-18.6	-175.4 -175.4 -172.5 -167 -164 -164	0 90 99 99.714 99.971 100	40 <sup>3</sup>	1 m Rec. S.[4/57]
17.8-18.6	-178.4 -178.4 -171.4 -170.5 -166 -164 -164	0 99.4 99.9 99.913 99.971 99.977 100	40 <sup>3</sup>	2 m Rec. S.[4/57]
17.8-18.6	-185.4 -185.4 -180 -180 -172 -164 -164	0 99.8 99.8 99.943 99.943 99.998 100	40 <sup>3</sup>	5 m Rec. S.[4/57]

<sup>1</sup> For certain receive earth stations, see also ADD **S9.7A** and ADD **S9.7B**.

<sup>2</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

<sup>3</sup> For non-GSO emission bandwidths greater than 40 kHz, the EPFD<sub>down</sub> limits may be scaled by adding  $10 \log(\text{non-GSO emission bandwidth} / 40 \text{ kHz})$  in a reference bandwidth equal to the emission bandwidth.

**ADD TABLE S22-1C<sup>1</sup>**  
**Limits to the EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands**

<b>Frequency Band (GHz)</b>	<b>EPFD<sub>down</sub> dB(W/m<sup>2</sup>)</b>	<b>Percentage of time during which EPFD<sub>down</sub> may not be exceeded</b>	<b>Reference Bandwidth (kHz)</b>	<b>Reference antenna diameter, and reference pattern</b>
19.7-20.2	-187.4 -182 -172 -154 -154	0 71.429 97.143 99.983 100	40 <sup>3</sup>	70 cm Rec. S.[4/57]
19.7-20.2	-190.4 -181.4 -170.4 -168.6 -165 -160 -154 -154	0 91 99.8 99.8 99.943 99.943 99.997 100	40 <sup>3</sup>	90 cm Rec. S.[4/57]
19.7-20.2	-198.4 -190.4 -171.4 -169.4 -166 -160 -154 -154	0 90 99.99 99.99 99.99714 99.99714 99.99943 100	40 <sup>3</sup>	2.5 m Rec. S.[4/57]

<sup>1</sup> For certain receive earth stations, see also ADD **S9.7A** and ADD **S9.7B**.

<sup>2</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

<sup>3</sup> For non-GSO emission bandwidths greater than 40 kHz, the EPFD<sub>down</sub> limits may be scaled by adding 10 log(non-GSO emission bandwidth / 40 kHz) in a reference bandwidth equal to the emission bandwidth.

**Editorial Note to Table S22-1C:** The table below contains the single-entry EPFD<sub>down</sub> masks for the 2.5 and 5 meter antennas in the 19.7-20.2 GHz band supported by the majority of participants at the final JTG 4-9-11 meeting and included in the draft CPM Report.

<b>Frequency band (GHz)</b>	<b>EPFD<sub>down</sub> dB(W/m<sup>2</sup>)</b>	<b>Percentage of time during which EPFD<sub>down</sub> may not be exceeded</b>	<b>Reference bandwidth (kHz)</b>	<b>Reference antenna diameter, and reference radiation pattern<sup>2</sup></b>
19.7-20.2	-196.4	0	40	2.5 m Rec. S.[4/57]

	-154.35 -154.35	99.9971 100		
19.7-20.2	-200.4 -195 -189.4 -189 -184 -175 -163.5 -154.35 -154.35	0 66 90 92 97.143 99.886 99.99 99.999 100	40	5 m Rec. S [4/57]

*Due to the late introduction of this proposal, nearing the end of the meeting, the U.S. was unable to agree to these masks. Nevertheless, the U.S. is continuing to work towards resolving the differences between the two masks for the 2.5 meter antenna. It is noted that the U.S. does not currently see the need for an EPFD<sub>down</sub> mask for the 5 meter antenna diameter in this band, and is of the view that the final 2.5 meter mask should also protect antenna sizes up to 3.5 meters.*

#### ADD TABLE S22-1D

#### Limits to the EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands

##### 30cm, 45cm and 60cm BSS antennas

Frequency band (GHz)	EPFD <sub>down</sub> dB(W/m <sup>2</sup> ) <sup>1</sup>	Percentage of time during which EPFD <sub>down</sub> may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern <sup>2</sup>
11.7 – 12.5 GHz In Region 1 11.7 – 12.2 GHz and 12.5 – 12.75 GHz In Region 3 12.2 – 12.7 GHz In Region 2	-165.841 -165.541 -164.041 -158.600 -158.600 -158.330 -158.330	0.000 25.000 96.000 98.857 99.429 99.429 100.000	40	30 cm DNR ITU-R BO. [Doc. 11/137 Annex 1]
11.7 – 12.5 GHz In Region 1 11.7 – 12.2 GHz and 12.5 – 12.75 GHz In Region 3 12.2 – 12.7 GHz In Region 2	-175.441 -172.441 -169.441 -164.000 -160.750 -160.000 -159.900	0.000 66.000 97.750 99.357 99.809 99.986 100.000	40	45 cm DNR ITU-R BO. [Doc. 11/137 Annex 1]

11.7 – 12.5 GHz In Region 1	-176.441 -173.191 -167.750	0.000 97.800 99.371	40	60 cm DNR ITU-R BO.[Doc. 11/137 Annex 1]
11.7 – 12.2 GHz and 12.5 – 12.75 GHz In Region 3	-162.000 -161.000 -160.200	99.886 99.943 99.971		
12.2 – 12.7 GHz In Region 2	-160.000 -159.900	99.997 100.000		

<sup>1</sup> For checking compliance with these limits, the BR software will use increments of 0.1 dB and will test against the fractionally more severe value: for example where the EPFD<sub>down</sub> limit is -165.841 dB(W/m<sup>2</sup>/40 kHz) the software will test against a criterion of -165.9 dB(W/m<sup>2</sup>/40 kHz).

<sup>2</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

### ADD TABLE S22-1E

#### Limits to the EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands

##### 90cm and 120cm BSS antennas

Frequency band (GHz)	EPFD <sub>down</sub> dB(W/m <sup>2</sup> ) <sup>1</sup>	Percentage of time during which EPFD <sub>down</sub> may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern <sup>2</sup>
11.7 – 12.5 GHz In Region 1	-178.94 -178.44 -176.44	0.000 33.000 98.000	40	90 cm  DNR ITU-R BO. [Doc. 11/137 Annex 1]
11.7 – 12.2 GHz and 12.5 – 12.75 GHz	-171.00 -165.50	99.429 99.714		
In Region 3	-163.00	99.857		
12.2 – 12.7 GHz	-161.00	99.943		
In Region 2	-160.00	99.991		
	-159.90	100.000		
11.7 – 12.5 GHz In Region 1	-182.440 -180.690 -179.190 -178.440	0.000 90.000 98.900 98.900	40	120 cm  DNR ITU-R BO.
11.7 – 12.2 GHz and 12.5 – 12.75 GHz	-174.940 -173.750 -173.000	99.500 99.680 99.680		

In Region 3	-169.500	99.850		[Doc. 11/137 Annex 1]
12.2 – 12.7 GHz	-167.800	99.915		
In Region 2	-164.000	99.940		
	-161.900	99.970		
	-161.000	99.990		
	-160.400	99.998		
	-159.900	100		

<sup>1</sup> For checking compliance with these limits, the BR software will use increments of 0.1 dB and will test against the fractionally more severe value: for example where the EPFD<sub>down</sub> limit is -165.841 dB(W/m<sup>2</sup>/40 kHz) the software will test against a criterion of -165.9 dB(W/m<sup>2</sup>/40 kHz).

<sup>2</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

### ADD TABLE S22-1F

#### Limits to the EPFD<sub>down</sub> radiated by non-GSO FSS systems in certain frequency bands

##### 180cm and 240cm BSS antennas

Frequency band (GHz)	EPFD <sub>down</sub> dB(W/m <sup>2</sup> ) <sup>1</sup>	Percentage of time during which EPFD <sub>down</sub> may not be exceeded	Reference bandwidth (kHz)	Reference antenna diameter, and reference radiation pattern <sup>2</sup>
11.7 – 12.5 GHz In Region 1	-198.24 -198.24 -196	0 96.92 97.96	4	180 cm  DNR ITU-R BO. [Doc. 11/137 Annex 1]
11.7 – 12.2 GHz and	-192	99.03		
12.5 – 12.75 GHz In Region 3	-188 -185	99.53 99.73		
12.2 – 12.7 GHz In Region 2	-182 -178.8 -178.8	99.85 99.91 100		
11.7 – 12.5 GHz In Region 1	-200.4 -200.4 -198	0 99.41 99.62		
11.7 – 12.2 GHz and	-195 -193	99.78 99.85		
12.5 – 12.75 GHz In Region 3	-190 -187	99.91 99.95		
12.2 – 12.7 GHz	-184	99.97	4	240 cm  DNR ITU-R BO. [Doc. 11/137 Annex 1]

In Region 2	-184	100		
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<sup>1</sup> For checking compliance with these limits, the BR software will use increments of 0.1 dB and will test against the fractionally more severe value: for example where the EPFD<sub>down</sub> limit is -165.841 dB(W/m<sup>2</sup>/40 kHz) the software will test against a criterion of -165.9 dB(W/m<sup>2</sup>/40 kHz).

<sup>2</sup> Under this Section, reference patterns are to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS and BSS systems.

***Editorial Note to Table S22-1F:*** Recognizing the work performed to date by the ITU-R and the masks included in Chapter 3 of the CPM Report, further analysis is being conducted on the proposed BSS EPFD<sub>down</sub> masks for the 180 cm and 240 cm antenna sizes. For example, the possibility of a latitude dependent EPFD<sub>down</sub> level for 100 percent of the time is under study with a view to relaxing the 100% EPFD<sub>down</sub> level of the U.S. proposed masks in Table S22-1F.

- ADD S22.5C** 2) The equivalent power flux-density<sup>xx</sup>, EPFD<sub>up</sub>, produced at any point in the geostationary-satellite orbit by emissions from all the earth stations in a non-geostationary-satellite system in the fixed-satellite service in the frequency bands listed in Table **S22-2**, for all conditions and for all methods of modulation, shall not exceed the limits given in Table **S22-2** for the specified percentages of time. These limits relate to the equivalent power flux-density which would be obtained under free-space propagation conditions, into a reference antenna and in the reference bandwidth specified in Table **S22-2**, for all pointing directions towards the Earth's surface visible from the geostationary-satellite orbit.

**ADD TABLE S22-2**

**Limits to the EPFD<sub>up</sub> radiated by non-GSO FSS systems in certain frequency bands**

Frequency band (GHz)	EPFD <sub>up</sub> dB(W/m <sup>2</sup> )	Percentage of time during which EPFD <sub>up</sub> may not be exceeded	Reference bandwidth (kHz)	Reference antenna beamwidth and reference radiation pattern <sup>2</sup>
12.50 - 12.75 12.75 - 13.25 13.75 - 14.5	-160	100	40	4 degrees ITU-R S.672, Ls = -20 <sup>1</sup>
17.3-17.8 Region 1 and Region 3 <sup>3</sup> 17.8-18.1	-160	100	40	4 degrees ITU-R S.672, Ls = -20 <sup>1</sup>
27.5 – 28.6	-162	100	40	1.55 degrees ITU-R S.672, Ls = -10 <sup>1</sup>
29.5 – 30.0	-162	100	40	1.55 degrees ITU-R S.672, Ls = -10 <sup>1</sup>
<sup>1</sup> For the case of Ls=-10, the values a=1.83 and b=6.32 should be used in the equations in Annex 1 of Recommendation ITU-R S.672 for single-feed circular beams. In all cases of Ls, the parabolic main beam equation should start at zero. <sup>2</sup> Under this Section, this reference pattern is to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS systems. <sup>3</sup> Although the 17.3-17.8 GHz band is not allocated to non-GSO FSS in Region 2, this EPFD <sub>up</sub> level also applies to the frequency band 17.3-17.8 GHz to protect BSS feeder links in Region 2 from non-GSO FSS Earth-to-space transmissions in Regions 1 and 3.				

**ADD S22.5D** 3) The equivalent power flux-density<sup>xx</sup>, EPFD<sub>is</sub>, produced at any point in the geostationary-satellite orbit by emissions from all the space stations in a non-geostationary-satellite system in the fixed-satellite service in the frequency bands listed in Table **S22-3**, including emissions from a reflecting satellite, for all conditions and for all methods of modulation, shall not exceed the limits given in Table **S22-3** for the specified percentages of time. These limits relate to the equivalent power flux-density which would be obtained under free-space propagation conditions into a reference antenna and in the reference bandwidth specified in Table **S22-3**, for all pointing directions towards the Earth's surface visible from the geostationary-satellite orbit.

**ADD TABLE S22-3**

**Limits to the EPFD<sub>is</sub> radiated by non-GSO FSS systems in certain frequency bands**

Frequency band (GHz)	EPFD <sub>is</sub> dB(W/m <sup>2</sup> )	Percentage of time during which EPFD <sub>is</sub> may not be exceeded	Reference bandwidth (kHz)	Reference antenna beamwidth and reference radiation pattern <sup>1</sup>
10.7 - 11.7 (Region 1) 12.5 - 12.75 (Region 1) 12.7 - 12.75 (Region 2)	-160	100	40	4 degrees ITU-R S.672, Ls = -20
17.8 - 18.4	-160	100	40	4 degrees ITU-R S.672, Ls = -20

<sup>1</sup> Under this Section, this reference pattern is to be used only for the calculation of interference from non-GSO FSS systems into GSO FSS systems.

**ADD S22.5E** The limits given in Tables **S22-1A** through **S22-1F** may be exceeded on the territory of any country whose Administration has so agreed.

**ADD S22.5F** The limits specified in No **S22.5B** to **S22.5D** apply to non-GSO FSS systems for which complete notification information has been received after 22 November 1997.

**ADD S22.5G**

An administration operating a non-GSO FSS system which is in compliance with the limits in No. **S22.5B** to **S22.5D** (see also Resolution WWW) shall be considered as having fulfilled its obligations under No. **S22.2** with respect to any GSO network, irrespective of the dates of receipt by the Bureau of the complete notification information for the non-GSO system and of the complete coordination information for the GSO network, provided that the EPFD<sub>down</sub> radiated by the non-GSO FSS system into any operating GSO FSS earth station does not exceed the operational limits given in Table **S22-4**, when the gain of this earth station is equal to or greater than the corresponding value given in Table **S22-4** for the corresponding orbital inclination of the GSO FSS satellite as given in Table **S22-4**.

**ADD TABLE S22-4**  
**Operational Limits to the EPFD<sub>down</sub> radiated by non-GSO FSS**  
**systems in certain frequency bands**

Frequency Band (GHz)	EPFD <sub>down</sub> dB(W/m <sup>2</sup> )	Percentage of time during which EPFD <sub>down</sub> may not be exceeded	Reference Bandwidth (kHz)	Receive GSO earth station antenna Gain (dBi)	Orbital inclination of GSO satellite
10.7 - 12.75 GHz	-163	100	40	≥59	≤2.5°
	TBD	100	40	≥49	≤2.5°
	[-160]	100	40	≥59	>2.5 and ≤4.5°
19.7 - 20.2 GHz	-157	100	40 <sup>2</sup>	≥55	≤2.5
	-157	100	40 <sup>2</sup>	≥43 <sup>1</sup>	≤2.5

<sup>1</sup> The operational limit applies only to non-GSO systems operating at altitudes of 7000 km or above in order to protect GSO FSS systems employing adaptive coding.

<sup>2</sup> For non-GSO emission bandwidths greater than 40 kHz, the EPFD<sub>down</sub> limits may be scaled by adding 10 log(non-GSO emission bandwidth / 40 kHz) in a reference bandwidth equal to the emission bandwidth.

**ADD S22.5H**

In case of *force majeure*, telecommand and ranging carriers transmitted to non-geostationary satellites in the fixed-satellite service are not subject to the limits given in Table **S22-2**.

**IV. Draft Proposals of IWG-5 (Informal Working Group on Space Science, Radio Astronomy, Maritime Mobile and Aeronautical Service Matters (WAC/084(24.06.99))**

**United States of America**

**[DRAFT] PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Proposal for Agenda Item 1.10**

*to consider the results of ITU-R studies carried out in accordance with Resolution 218 (WRC-97) and take appropriate action on this subject*

**Background Information:** Resolution 218 requests the ITU-R to develop assumptions and methodologies, and gather information on actual GMDSS and AMS(R)S communication traffic usage and growth, in order to determine the future spectrum requirements for the provision of distress, urgency and safety communications in the GMDSS by the mobile-satellite service and AMS(R)S communications with priority 1 to 6 of Article S44.

The work to define future spectrum requirements of AMS(R)S has not been completed under Resolution 218. This can easily be seen from the chairman's report from the last meeting of Working Party 8D which states,

“Two studies have been performed that used significantly different assumptions to calculate the future spectrum requirements of AMS(R)S” and “Significant disagreement exists on the approaches and methodologies to be used in such studies.”

One study, from ICAO and IATA established that the future requirements of AMS(R)S will be 10.8 MHz by 2010. A second study, prepared by one administration, indicated that the future spectrum requirements could be accommodated in only 1 MHz of spectrum by 2025. Until a consensus agreement has been reached, it is premature to propose any regulatory solution, until the scope and magnitude of the problem can be more clearly defined.

As there is no agreement at the ITU-R regarding the future spectrum requirements of AMS(R)S, it is premature to make any changes to the Radio Regulations until the work is completed and a consensus is reached. The US does support the completion of the ITU-R studies called for under Resolution 218, which may lead to appropriate regulatory action based on this knowledge.

At a recent regional WRC preparatory meeting, one administration proposed to modify part of the text in S5.357A as follows:

“...AMS(R)S with priority 1 to 6 in Article S44 shall have priority access and immediate availability, by pre-emption if necessary, over all other mobile-satellite communications operating within a any network....”

This seemingly small and innocuous change has tremendous economic and operation implications

to any and all MSS systems who use or wish to use these bands. By changing, “within a network” to “within any network”, the concept of inter-system coordination and “traffic sharing” is now introduced. The implications associated with this significant change are not at all understood and will need extensive study at the ITU-R.

There was also a view expressed that a proposal of NOC to the Table of Allocations and associated RR footnotes does not ensure that aviation will continue to have access to the generic MSS spectrum in the bands 1525 – 1559 MHz and 1626.5 – 1660.5 MHz. This current status may limit or preclude the expansion of aviation into the space based communications services. This expansion can satisfy aviation’s needs for worldwide spectrum and continuous communications and enhance aviation safety.

**Proposal:**

USA/1.10/1

**NOC****1525-1559 MHz**

Allocation to Services											
Region 1				Region 2				Region 3			
<b>1525-1530</b> SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite Mobile except aeronautical mobile S5.349  S5.341 S5.342 S5.350 S5.351 S5.352A S5.354				<b>1525-1530</b> SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite Fixed Mobile S5.343  S5.341 S5.351 S5.354				<b>1525-1530</b> SPACE OPERATION (space-to-Earth) FIXED MOBILE-SATELLITE (space-to-Earth) Earth exploration-satellite Mobile S5.349  S5.341 S5.351 S5.352A S5.354			
<b>1530-1535</b> SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.353A Earth exploration-satellite Fixed Mobile except aeronautical mobile  S5.341 S5.342 S5.351 S5.354				<b>1530-1535</b> SPACE OPERATION (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.353A Earth exploration-satellite Fixed Mobile S5.343  S5.341 S5.351 S5.354							
<b>1535-1559</b>  MOBILE-SATELLITE (space-to-Earth)  S5.341 S5.351 S5.353A S5.354 S5.355 S5.356 S5.357 S5.357A S5.359 S5.362A											

**Reason:** As there is no agreement at the ITU-R regarding the future spectrum requirements of AMS(R)S, it is premature to make any changes to the Radio Regulations until the work is completed and a consensus is reached. The US does support the completion of the ITU-R studies called for under Resolution 218, which may lead to appropriate regulatory action based on this knowledge.

**Note:** *There was a view expressed that S5.353A should be modified to ensure that the Aviation community will have continuous and guaranteed access to this spectrum in the future.*

USA/1.10/2

NOC

**1626.5-1660.5**

Allocation to Services										
Region 1			Region 2				Region 3			
1626.5-1660										
MOBILE-SATELLITE (Earth -to-space)										
S5.341	S5.351	S5.353A	S5.354	S5.355	S5.357A	S5.359	S5.362A	S5.374	S5.375	S5.376

**Reason:** As there is no agreement at the ITU-R regarding the future spectrum requirements of AMS(R)S, it is premature to make any changes to the Radio Regulations until the work is completed and a consensus is reached. The US does support the completion of the ITU-R studies called for under Resolution 218, which may lead to appropriate regulatory action based on this knowledge.

**Note:** *There was a view expressed that S5.357A should be modified to ensure that the Aviation community will have continuous and guaranteed access to this spectrum in the future.*

**V. Draft Proposals of IWG-6 (Informal Working Group on Appendices 30 and 30A Matters (Broadcasting-Satellite Service) (WAC/085(24.06.99))**

**United States of America**

**[DRAFT] PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Proposals for Agenda Item 1.20**

*to consider the issues related to the application of Nos. S9.8, S9.9 and S9.17 and the corresponding parts of Appendix S5 with respect to Appendices S30 and S30A, with a view to possible deletion of Articles 6 and 7 of Appendices S30 and S30A, also taking into consideration Recommendation 35 (WRC-95);*

**Background Information:** Annex 1 to Appendix S30 of the Radio Regulations specifies limits for determining whether a service is affected by a proposed modification to the BSS Plan or when it is necessary to seek the agreement of any other administration. Section 5 of Annex 1 specifies limits to the change in the PFD to protect the terrestrial services of administrations in Regions 1 and 3 from modifications to the Region 2 Plan.

Section 5c specifies the PFD limits for administrations in Region 1 east of longitude 30°E. This PFD limit is very tight at low angles of elevation. In order to meet this PFD limit the Region 2 BSS spacecraft EIRP towards Alaska must be significantly lower compared to the continental United States. As a result the provision of BSS service to Alaska, from U.S. orbital assignments at 101W, 110W and 119W, requires larger BSS receive dishes, in some cases as large as 1.8 m. This will also be the case for Region 2 administrations that propose to modify their assignments to provide service to the United States. The US Administration requires provision of service to Alaska when technically feasible.

A relaxation in the PFD limit in Section 5c of Annex 1 of Appendix S30, as proposed below, would allow the use of 60 cm BSS receive dishes in Alaska for BSS service from the 101W, 110W and 119W orbital locations.

It is noted that a Joint Rapporteur Group between JWP 10/11S and WP 9D has been established to evaluate the power flux density limits specified in Section 5c and perhaps other terrestrial power flux density limits in Annex 1 of Appendix S30.

Proposal:

## APPENDIX S30

### ANNEX 1

#### ".....5. Limits to the change in the power flux-density to protect the terrestrial services of administrations in Regions 1 and 3<sup>16</sup>

**USA/1.20/01** c) in the frequency band 12.2-12.7 GHz for territories of  
administrations in Region 1<sup>17</sup>, east of longitude 30° E:  
**MOD**  $-134 \pm 4.6975 \gamma^2$  dB(W/m<sup>2</sup>/5 MHz) for  $0^\circ \leq \gamma \leq 0.8^\circ$ ;  
 $-128.5 + 25 \log \gamma$  dB(W/m<sup>2</sup>/5 MHz) for  $\gamma > 0.8^\circ$ ;  
 ~~$-134 \pm 4.6975 \gamma^2$  dB(W/m<sup>2</sup>/5 MHz) for  $0^\circ \leq \gamma \leq 0.8^\circ$ ;  
 $-128.5 + 25 \log \gamma$  dB(W/m<sup>2</sup>/5 MHz) for  $\gamma > 0.8^\circ$ ;~~

**Reasons:** To allow the provision of BSS service to all of Alaska using 60 cm receive dishes, from the U.S. BSS assignments at 101W, 110W and 119W and from other Administration's orbital locations who plan to provide BSS service to the United States.

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<sup>16</sup> See § 3.18 of Annex 5.

<sup>17</sup> In the band 12.5-12.7 GHz in Region 1, these limits are applicable only to the territory of administrations mentioned in Nos. **S5.494** and **S5.496**.

## **VI. Draft Proposals of IWG-7 (Informal Working Group on Fixed and Fixed-Satellite Service 36-51 GHz Matters)**

### **A. Proposal 1 (WAC/088(24.06.99))**

#### **United States of America**

#### **[DRAFT] PROPOSALS FOR THE WORK OF THE CONFERENCE**

##### **Proposals for Agenda Item 1.4**

*to consider issues concerning allocations and regulatory aspects related to Resolutions 126 (WRC-97), 128 (WRC-97), 129 (WRC-97), 133 (WRC-97), 134 (WRC-97) and 726 (WRC-97)*

### **Background**

*Requests ITU-R 1 of Resolution 133 (WRC-97)* requested the ITU-R to determine whether the power-flux density limits included in Article S21 of the Radio Regulations adequately protect terrestrial services from FSS networks in the band 37.0-40.0 GHz. Resolution 129 (WRC-97) requested the ITU-R to undertake studies of appropriate criteria and methodologies for sharing, including power flux-density limits, between the fixed-satellite service and the other services with allocations in the band 40.5-42.5 GHz.

The results of studies conducted in the ITU-R of known and proposed non-GSO FSS systems, and of known and proposed P-P and P-MP FS systems, indicate that maximum allowable values of power flux-density of -120/-105 dB(W/m<sup>2</sup>-MHz) at the surface of the Earth would be adequate to protect terrestrial services from non-GSO FSS networks in the frequency band 37.5 - 40.5 GHz.

The results of studies conducted in the ITU-R of known and proposed non-GSO FSS systems, and of known and proposed P-P and P-MP FS systems, indicate that maximum allowable values of power flux-density of -115/-105 dB(W/m<sup>2</sup>-MHz) at the surface of the Earth would be adequate to protect terrestrial services from non-GSO FSS networks in the frequency band 40.5 - 42.5 GHz.

In both cases, the studies were deemed valid for non-GSO FSS systems comprised of 99 or fewer satellites, and that independent verification would have to be performed if these levels were to be applied to any non-GSO FSS system with more than 99 satellites in its constellation. The results of the studies are reflected in Draft New Recommendation [4-9S/AH1], Maximum Allowable Values of Power Flux-Density at the Surface of the Earth Produced by Non-Geostationary Satellites in the Fixed-Satellite Service Operating in the 37.5-40.5 GHz and 40.5-42.5 GHz Bands to Protect the Fixed Service.

The results of studies conducted in the ITU-R show that, for a range of non-GSO and GSO fixed-satellite systems, and for a point-to-point and point-to-multipoint fixed service system operating with elevation angles that range from 0° - 40°, the pfd levels of -115/-105 dB(W/m<sup>2</sup> per MHz) are adequate to protect the fixed service in the band 37.5-42.5 GHz from interference caused by GSO fixed-satellite service systems.

On the basis of these conclusions, the United States makes the following proposals for modifications and additions to Table S21-4 of Article S21 are made, and to suppress Resolutions 133 and 129 (both WRC-97). The United States bases its proposal to suppress Resolution 133 on the completion of the power flux-density studies referenced in Resolves 1 of that Resolution. To the extent that there may be aspects of studies that encompass matters in Resolves 2 of Resolution 133 still ongoing in the ITU-R, particularly on issues of coordination

methodology, the United States may make additional proposals (e.g., for a new WRC-2000 Resolution) to enable the completion of any such studies that have not been successfully completed prior to WRC-2000.

# PROPOSALS UNDER AGENDA ITEM 1.4 (Resolutions 133 and 129):

## USA/A1.4/03 Modifications to Table S21-4 MOD

	Frequency band	Service	Limit in dB(W/m <sup>2</sup> ) for angle of arrival (*) above the horizontal plane			Reference bandwidth
			0° - 5°	5° - 25°	25° - 90°	
	...					
MOD	31.0-31.3 GHz 34.7-35.2 GHz (S-E transmissions referred to in No. <b>S5.550</b> on the territories of countries listed in No. <b>S5.549</b> ) 37.0-40.5 GHz	Fixed-Satellite <u>(geostationary-satellite orbit)</u> Mobile-Satellite Space Research	-115 <sup>10</sup>	-115 + 0.5 (*) <sup>10</sup>	-105 <sup>10</sup>	1 MHz
	<u>37.5-40.5 GHz</u>	<u>Fixed-Satellite</u> <u>(non-geostationary-satellite orbit)</u>	<u>-120<sup>10</sup></u>	<u>-120 + 0.75 (*)<sup>10</sup></u>	<u>-105<sup>10</sup></u>	<u>1 MHz</u>
	<u>40.5-42.5 GHz</u>	<u>Fixed-Satellite</u>	<u>-115<sup>10</sup></u>	<u>-115 + 0.5 (*)<sup>10</sup></u>	<u>-105<sup>10</sup></u>	<u>1 MHz</u>

**MOD 10 S21.16.4** The values given in this table shall not apply to emissions of space stations on non-geostationary satellites in networks operating with 100 or more satellites.

**Reasons:** The PFD-review objectives of Resolutions **133 (WRC-97)** and **129 (WRC-97)** have been met. The values stated above for non-geostationary satellite orbit FSS systems in the bands 37.5-40.5 GHz and 40.5-42.5 GHz respectively are included in a draft new recommendation approved by the ITU-R. See Draft New Recommendation [4-9S/AH1], Maximum Allowable Values of Power Flux-Density at the Surface of the Earth Produced by Non-Geostationary Satellites in the Fixed-Satellite Service Operating in the 37.5-40.5 GHz and 40.5-42.5 GHz Bands to Protect the Fixed Service. In addition, studies have demonstrated the suitability for application to geostationary satellite-orbit FSS systems of the current pfd limits in the 37.5-40 GHz band and the application of the same limits to the fixed-satellite service in the 40.5-42.5 GHz band.

USA/A1.4/04

SUP

Resolution 133

~~Resolution 133 (WRC-97)~~

~~Sharing Between the Fixed Service and Other Services in the Band 37-40 GHz~~

Reasons: Consequential

USA/A1.4/05

SUP

Resolution 129

~~Resolution 129 (WRC-97)~~

~~Criteria and Methodologies for Sharing Between the Fixed-Satellite Service and Other Services with Allocations in the Band 40.5-42.5 GHz~~

Reasons: Consequential

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**B. Proposal 2 (WAC/089(24.06.99))**

**United States of America**

**[DRAFT] PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Proposals for Agenda Item 1.4\***

*to consider issues concerning allocations and regulatory aspects related to Resolutions 126 (WRC-97), 128 (WRC-97), 129 (WRC-97), 133 (WRC-97), 134 (WRC-97) and 726 (WRC-97)*

**Background Information: Resolution 134 (WRC-97)** makes the date of the provisional application of the allocation to the FSS in Regions 1 and 3 in the band 40.5-42.5 GHz 1 January 2001, and calls for review of the allocation and provisional application date. On the basis of studies conducted in the ITU-R, it is appropriate to advance the date of the application of the FSS allocation in Regions 1 and 3 to 2 June 2000 (upon the conclusion of WRC-2000) for the 40.5-41.5 GHz band, and to extend ~~the~~ this allocation to all of Region 1 (thereby enabling the removal of RR S5.551C, RR S5.551D and RR S5.551E, and the suppression of Resolution 134 (WRC-97)). Based on the ITU-R WP 4A contribution to the WRC-00 CPM that protecting the Radio Astronomy Service to the levels specified in existing ITU-R recommendations would mean a commercially impracticable FSS service, it is also appropriate to delete the allocation to the FSS worldwide in the 41.5-42.5 GHz band and suppress Resolution 128.

On the basis of these conclusions, the following proposals are made:

**Article S5**

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\* The proposals advanced in this paper do not represent the full extent of U.S. proposals to WRC-2000 on Agenda Item 1.4.

**GHz**  
**40.5-41.5**

USA/1.4/ 2  
MOD

Allocation to Services		
Region 1	Region 2	Region 3
<b>40.5-41.5</b> FIXED FIXED-SATELLITE (space-to-Earth) BROADCASTING BROADCASTING-SATELLITE Mobile  <del>S5.551B S5.551D</del>	<b>40.5-41.5</b> FIXED FIXED-SATELLITE (space-to-Earth) <del>S5.551B S5.551E</del> BROADCASTING BROADCASTING-SATELLITE Mobile  S5.551C <del>S5.551F</del>	<b>40.5-41.5</b> FIXED FIXED-SATELLITE (space-to-Earth) <del>S5.551B S5.551E</del> BROADCASTING BROADCASTING-SATELLITE Mobile  S5.551C <del>S5.551F</del>

**Reasons:** Studies in ITU-R confirm the feasibility of the fixed-satellite service allocation in the bands ~~40.5-42.5~~ 40.5-41.5 GHz, and the need for harmonized global allocations. With the elevation of the allocation to full primary status in all 3 regions, the footnote allocation for countries in Region 1 can be removed. Those countries that are listed or that have territories listed in RR **S5.551C** should give consideration to whether the alternative allocation in certain countries and territories in Regions 2 and 3 can be suppressed. Acceleration of the effective date allows for removal of the reference to Resolution **134 (WRC-97)**. ~~In advancing this proposal, it must be recognized that fixed-satellite service systems in the band 41.5-42.5 GHz may not be implemented until technical and operational measures have been identified and agreed within ITU-R to protect the radio astronomy service in the band 42.5-43.5 GHz from harmful interference.~~

**Article S5**

**GHz**  
**41.5-42.5**

USA/1.4/ 3  
SUP

Allocation to Services		
Region 1	Region 2	Region 3
<del>40.5-42.5</del> FIXED BROADCASTING BROADCASTING-SATELLITE Mobile	<del>40.5-42.5</del> FIXED <del>FIXED-SATELLITE</del> <del>(space-to-Earth)</del> <del>S5.551B S5.551E</del> BROADCASTING	<del>40.5-42.5</del> FIXED <del>FIXED-SATELLITE</del> <del>(space-to-Earth)</del> <del>S5.551B S5.551E</del> BROADCASTING

USA/1.4/ 7  
SUP

	BROADCASTING- SATELLITE Mobile <del>S5.551B S5.551D</del>	BROADCASTING- SATELLITE Mobile <del>S5.551C S5.551E</del>
		<del>S5.551C-S5.551F</del>

USA/1.4/ 6  
SUP

**Reasons:** At the recently completed meeting of ITU-R Working Party 4A, dealing with FSS matters, submitted text regarding Resolution 128 and protection of the Radio Astronomy Service. This text, for addition to Section 6.1.3.2.3 of the CPM Report, stated that “If the fixed-satellite service is constrained to the levels of attenuation contained in Table 1, it is unlikely to be practicable for the FSS allocation in the frequency band 41.5-42.5 GHz to be used for commercial FSS applications”. As support for this allocation by the US was, at WRC-97, and is contingent on protecting the Radio Astronomy Service from harmful interference, deletion of the allocation to the FSS in this band segment is necessary.

~~S5.551D~~

**Reasons:** Consequential to USA/1.4/01.

USA/1.4/ 4  
SUP

~~S5.551E~~

**Reasons:** Consequential to USA/1.4/01.

USA/1.4/ 5  
SUP

#### **~~Resolution 134 (WRC-97)~~**

#### **~~Use of the frequency band 40.5-42.5 GHz by the fixed-satellite service~~**

**Reasons:** Consequential to USA/1.4/01.

#### **~~RESOLUTION 128 (WRC-97)~~**

#### **~~Allocation to the fixed-satellite service (space-to-Earth) in the 41.5-42.5 GHz band and protection of the radio astronomy service in the 42.5-43.5 GHz band~~**

**Reason:** Consequential to USA/1.4/02. Additionally, WP 4A has indicated protection of the Radio Astronomy Service to the levels indicated in the WP 7D input to the CPM Report on Resolution 128, values derived from existing ITU-R recommendations noted in the WP 7D output report, would mean the FSS allocation in the 41.5-42.5 GHz band would be unlikely to be practicable for use for commercial FSS applications.

**C. Proposal 3 (WAC/105(24.06.99))**

**United States of America**

**[DRAFT] PROPOSALS FOR THE WORK OF THE CONFERENCE**

**Proposals for Agenda Item 1.5**

to consider regulatory provisions and possible additional frequency allocations for services using high altitude platform stations, taking into account the results of ITU-R studies conducted in response to Resolution **122 (WRC-97)**;

**Background**

Resolution **122 (WRC-97)**, “Use of the bands 47.2 – 47.5 GHz and 47.9 – 48.2 GHz by high altitude platform stations in the fixed service and by other services”, instructs the Director of the Radiocommunication Bureau, that from 22 November 1997, to accept notices in the 47.2 – 47.5 and 49.2 – 48.2 GHz only for high altitude platform stations in the fixed service and for feeder links for the broadcasting-satellite services pending review of sharing studies between co-primary services in the band. On the basis of studies conducted in the ITU-R, it is appropriate to modify Resolution 122 (WRC-97). A draft new Recommendation [4-9S/AAX] has been developed that establishes the performance parameters for FSS antennas that can share with the HAPS system.

On the basis of these conclusions, the following proposal is made:

**USA/1.5/XX**

**MOD Resolution 122 (WRC-97)**

**RESOLUTION 122 (WRC-97)**

**Use of the bands 47.2-47.5 GHz and 47.9-48.2 GHz by high altitude platform stations in the fixed service and by other services**

The World Radiocommunication Conference (~~Geneva, 1997~~Istanbul, 2000),

*considering*

- a) that the band 47.2-50.2 GHz is allocated to the fixed, mobile and fixed-satellite services on a co-primary basis;
- b) that ~~this conference has~~WRC-97 made provision for operation of high altitude platform stations, also known as stratospheric repeaters, within the fixed service in the bands 47.2-47.5 GHz and 47.9-48.2 GHz;
- c) that ITU has among its purposes “to promote the extension of the benefit of the new telecommunication technologies to all the world’s inhabitants” (No. 6 of the Constitution of the ITU (Geneva, 1992));
- d) that systems based on new technologies using high altitude platforms in the bands 47.2-47.5 and 47.9-48.2 GHz will be able to provide high-capacity, competitive services to urban and rural areas;
- e) that high altitude platform systems are in an advanced stage of development and some countries have notified such systems to ITU;
- f) that WRC-97 adopted a new definition of high altitude platform stations in Article S1, modified No. S11.24 and added No. S11.26 in the Radio Regulations providing for notices relating to assignments for high altitude platform stations in the bands 47.2-47.5 GHz and 47.9-48.2 GHz~~Board issued a provisional rule of procedure concerning notification periods in No. S11.24/1228 in February 1997;~~
- g) that ~~in spite of the urgency attached to the development of such systems, sharing and regulatory issues should be studied in order to achieve the most efficient use of the spectrum available for these systems~~ the ITU-R has confirmed that sharing is feasible between high altitude platform stations and the FSS;
- h) that technical studies are still required in order to ascertain the extent to which sharing of the bands 47.2-47.5 GHz and 47.9-48.2 GHz is feasible between systems using high altitude platforms in the fixed service and systems in the fixed, ~~fixed-satellite~~ and mobile services, and to ascertain the requirements to protect radio astronomy services in adjacent bands from spurious emissions;

i) that the radio astronomy service has primary allocations in the bands 42.5-43.5 GHz and 48.94-49.04 GHz

~~j) that ITU studies are already under way on the preferred characteristics of systems using high altitude platforms and the feasibility of sharing between these systems and systems of other services and between these systems and other systems in the fixed service (Questions ITU-R 212/9, ITU-R 218/9 and ITU-R 251/4;~~

~~k) that No. **S5.552** urges administrations to reserve fixed-satellite service use of the band 47.2-49.2 GHz for feeder links for the broadcasting-satellite service, and that preliminary ITU-R studies indicate that high altitude platform stations in the fixed service may share with broadcasting-satellite feeder links;~~

~~l) that the development of services using high altitude platform stations in these bands requires major investment and that manufacturers and operators should be given the confidence to make the necessary investment in these applications;~~

*resolves*

1 to urge administrations to facilitate coordination between high altitude platform stations in the fixed service operating in the bands 47.2-47.5 GHz and 47.9-48.2 GHz and other co-primary services in their territory and adjacent territories;

2 that, on a provisional basis, the procedures of Article **S9** shall be used for coordination between satellite systems and high altitude platform systems;

3 to request ITU-R to carry out urgently studies on the appropriate technical sharing criteria for the situations referred to in *considering h)*, with priority given to the sharing with other systems in the fixed and fixed-satellite services, ~~in particular the determination of the appropriate geographical separation from feeder links in the broadcasting-satellite service;~~

4 that WRC-9903 should review the results of these studies and consider refinement of the regulatory provisions for that might facilitate a broader application of these high altitude platform technologies,

*instructs the Director of the Radiocommunication Bureau*

1 that notices concerning high altitude platform stations that were received by the Bureau prior to 22 November 1997, and provisionally recorded in the Master International Frequency Register in accordance with the provisional rule of procedure issued by the Board, shall be maintained;

2 that ~~from 22 November 1997, and~~ pending review of the sharing studies in *considering h)* ~~and review of the notification process by WRC-99, the Bureau shall accept notices in the bands 47.2-47.5 GHz and 47.9-48.2 GHz only for high altitude platform stations in the fixed service, and for the fixed-satellite service, including feeder links for the broadcasting-satellite service, shall continue to process notices for fixed-satellite service networks (except for feeder links for the~~

~~broadcasting-satellite service) for which complete information for advance publication has been received prior to 27 October 1997, and shall inform the notifying administrations accordingly.~~

*EDITORIAL NOTE: A majority of the participants in IWG-7 concur in this document. However, one member, representing Sky Station International, has expressed a preference (1) to maintain and expand considering (j); (2) that the only modification to the resolves should be to postpone the reviewing conference from WRC-2000 to WRC-2003; and (3) to extend for a minimum of three more years (i.e., until the next conference) the freeze on FSS notices that is contained in “instructs the Director of the Radiocommunication Bureau” No. 2. The proposed expanded considering (j) would read as follows:*

j) that ITU-R studies are already under way on the preferred characteristics of systems using high altitude platforms and the feasibility of sharing between these systems and systems of other services and between these systems and other systems in the fixed service (Questions ITU-R 212/9, ITU-R 218/9 and ITU-R 251/4) and that although Draft New Recommendations [4-9S/AAX] and [9B/HAPS1] and [9B/HAPS2] have been developed, further studies are required to fully assess the implications of these scenarios and to consider the effect of mitigation techniques on increasing shared use of these bands by HAPS and other systems;

**VII. Draft Proposals of IWG-9 (Informal Working Group on Other Matters; Including Regulatory and Procedural Matters) (WAC/091(24.06.99))**

**United States of America**

**PROPOSAL FOR THE WORK OF THE CONFERENCE**

**Proposal for Agenda Item 1.8**

(to consider regulatory and technical provisions to enable earth stations located on board vessels to operate in the fixed-satellite service (FSS) networks in the bands 3 700 - 4 200 MHz and 5 925 - 6 425 MHz, including their coordination with other services allocated in these bands)

**Background Information:** This item concerns provision of communications by earth stations on board vessels using frequencies allocated to the fixed-satellite service and used by existing space segment in the fixed-satellite service. These stations operate in three distinct modes: at sea; while stationary in or near port; and in motion approaching or departing from port.

Operations at sea (beyond a certain distance for near-shore coordination) by earth stations on board vessels in the fixed-satellite service do not present a potential for interference to stations in the fixed service operating in accordance with the 6 GHz FS allocation, and therefore need not be coordinated. Operations while these earth stations are stationary at pre-determined points can be coordinated bilaterally with fixed service systems. Technical and regulatory issues concern the potential for interference between in-motion operations by these ESV earth stations operating close to shore and stations in the fixed service both on and offshore.

Attached is regulatory text that provides the framework for the authorization of earth stations on board vessels in the three different situations of operation; and through the application of constraints provides for the continued growth of terrestrial fixed services operating in accordance with the Radio Regulations.

There are a number of references to the distance [XXX] in the following proposal for Agenda Item 1.8. Determination of the [XXX] value or values must be accomplished before any regulatory/procedural proposals could be implemented.

**Proposal:**

**3 700 - 4 200 MHz**

**USA/1.8/01  
MOD**

Allocation to services		
Region 1	Region 2	Region 3
3700-4200 FIXED FIXED-SATELLITE ADD USA/1.8/03 Mobile	3700-4200 FIXED FIXED-SATELLITE (space-to-Earth) ADD USA/1.8/03 MOBILE except aeronautical mobile	

**Reasons:** To establish regulatory and technical provisions for operations of ESV earth stations on board vessels in the fixed-satellite service.

**5 925 - 6 425 MHz**

**USA/1.8/02  
MOD**

Allocation to services		
Region 1	Region 2	Region 3
5925-6425	FIXED FIXED-SATELLITE (Earth-to-space) ADD USA/1.8/03 S5.149 S5.440 S5.458	

**Reasons:** To establish regulatory and technical provisions for operations of earth stations on board vessels in the fixed-satellite service

**USA/1.8/03  
ADD**

S5.ESV Earth stations located on board vessels may use frequencies in this band and shall operate in the fixed-satellite service in accordance with Resolution **ZZZ (WRC-2000)**.

**Reasons:** To establish regulatory and technical provisions for operations of earth stations on board vessels in the fixed-satellite service.

Resolution ZZZ (WRC-2000)

**Provisions to Enable Earth Stations Located on board Vessels to Operate in Fixed-Satellite Service Networks in the Bands 3 700-4 200 MHz and 5 925-6 425 MHz**

The World Radiocommunication Conference (Istanbul, 2000),

*considering*

- a) that the technology exists that would permit the use of FSS networks by earth stations on board vessels (ESV) in the bands 3 700-4 200 MHz (space-to-Earth) and 5925-6425 MHz (Earth-to-space);
- b) that ESVs have the potential to cause unacceptable interference to fixed service systems in the band 5 925-6 425 MHz;
- c) that some administrations have been operating ESVs for several years under Radio Regulation S4.4;
- d) that ESV operations require considerably less than the full bandwidth in this FSS allocation and only a portion of the visible geostationary arc;
- e) that in order to ensure the protection and future growth of the FS, the ESV must operate with certain operational constraints;
- f) that the territory of an administration includes any off-shore structures or platforms with stations authorized by that administration;
- g) that a minimum distance from the territory of an administration can be calculated beyond which the ESV will not cause unacceptable interference to the fixed service in this band.

*resolves*

- 1. that an earth station on board a vessel (ESV) may be considered a station in the fixed-satellite service while receiving in the 3 700 - 4 200 MHz band and transmitting in the 5 925 - 6 425 MHz band;
- 2. that operation of ESVs that are at least [XXX] km from the territory of an administration in which stations in the fixed service operating in accordance with the Radio Regulations require no coordination or agreement;
- 3. that an ESV may be operated, either at a stationary position or while in motion, within [XXX] km from the territory of an administration with any fixed service station operating in accordance with the Radio Regulations using the bands 3 700 - 4 200 MHz (space-to-Earth) and 5 925 - 6 425 (Earth-to-space) of the fixed-satellite service, subject to the following:
  - (a) the authority for operating on radio frequencies within [XXX] km of territory on which such stations in the fixed service are operating belongs with the Administration responsible for that territory; however, the responsibility for the ESV lies with the Administration that authorized the use of the ESV,
  - (b) The administration that authorizes the use of the ESV in these bands shall ensure that such stations do not cause unacceptable interference to stations in the fixed service which themselves are established and operated in accordance with the Radio Regulations;

- (c) Before ESVs operate in the fixed-satellite service in these bands:
    - (i) a set of frequencies will be established in each area of intended operation for such use that have been coordinated with all other potentially affected users;
    - (ii) this set of frequencies will include only the necessary spectrum per vessel in these bands (maximum necessary bandwidth per ESV is 2.346 MHz);
    - (iii) coordination will be accomplished between the Administration(s) with authority over the potentially affected fixed service stations operating in these bands and the Administration that authorizes the ESV to operate while stationary in these bands; in accordance with the S9.17 provisions of the Radio Regulations;
    - (iv) upon completion of such coordination, the ESV will be authorized to operate in the fixed-satellite service subject to appropriate operational constraints in these bands;
  - (d) a list of the ESVs authorized to operate within [XXX] km of territory on which stations in the fixed service are operating in accordance with the Radio Regulations, the frequencies used and associated operational conditions that have been coordinated shall be established and maintained by the Administration responsible for the territory in which the fixed service stations are located; such list shall include a point of contact for obtaining this information;
  - (e) ESV operators must comply with the conditions established by the authorizing Administration(s); ESV use will be limited to the areas specified in the authorization with all of the constraints including minimum speeds.
4. that coordination of in-motion ESVs within [XXX] km of all stations in the fixed service operating in accordance with the Radio Regulations shall be accomplished using the provisions of the Annex to this Resolution.
  5. that every ESV operating under this provision shall be equipped with an automatic mechanism for continuously determining the location of the vessel and disabling operations in the event the vessel is within [XXX] km of the territory of an administration with stations in the fixed service operating in accordance with the Radio Regulations or that the ESV is outside any geographic area where its operation has been coordinated. The ESV shall also incorporate an automatic mechanism to terminate transmissions (a) when the antenna subsystem loses lock on the satellite and/or the ability to maintain tracking accuracy; or (b) when the antenna elevation drops below the ten degree required minimum elevation angle or (c) or when any operating parameter fails to meet the constraints established in the terms of the coordination agreement.
  6. that Administrations that authorize the use of the ESV shall ensure that personnel of vessels with ESVs are adequately qualified and certificated in accordance with the requirements of those Administrations to ensure the proper operation of the ESVs in accordance with the provisions of this Resolution.

7. that the operator of the ESV shall, as appropriate, provide evidence of the basis for the authority under which the station is operating (e.g. license or certification). When such authority cannot be produced or when manifest irregularities are observed, Administrations in whose territory vessels equipped with ESVs are visiting may inspect the ESV installations in order to satisfy themselves that the ESVs conform to the conditions imposed by this resolution, including the capability indicated in section 5.
8. that Administrations which authorize the use of the ESV shall ensure that the ESV shall be capable of operating in compliance with the requirements of this Resolution.

## Annex

### USE OF ESVS WHILE IN MOTION WITHIN THE DISTANCE [XXX] km IN THE BANDS 3700-4200 MHz AND 5925-6425 MHz

1. Unless otherwise provided in a bilateral coordination agreement, the minimum constraints on ESVs shall include:
  - a. minimum diameter of the ESV antenna must be at least 2.4 m;
  - b. minimum antenna elevation angle must be at least 10 degrees;
  - c. maximum necessary bandwidth/vessel: 2.346 MHz;
  - d. maximum necessary bandwidth in a single operating area: 36 MHz;
  - e. maximum ESV transmitter power spectral density 17 dB(W/MHz) (at input to the antenna);
  - f. minimum satellite tracking accuracy of 0.2 degrees;
  - g. maximum half-power antenna beamwidth of 1.5 degrees
2. The ESV transmissions from vessels within [XXX] km of stations in the fixed service operating in accordance with the Radio Regulations shall be based on agreements between the administrations concerned.
3. In order not to inhibit the growth of the fixed service, authorizations and agreements for the use of these frequencies by ESVs in accordance with the conditions of the coordinations shall extend for a fixed period of time (e.g. 1-3 years), but may be renewed;
4. ESVs will not claim protection while in motion from fixed service station transmissions.
5. Methods for establishing the basis for ESV use of frequencies in this band should be based on the most recent Recommendations of the ITU-R applicable to sharing between the fixed service and ESV use of the band.

**Reasons:** To establish regulatory and technical provisions for operations of earth stations on board vessels in the fixed-satellite service.

**VIII. Draft Proposals of IWG-10 (Informal Working Group on WRC-2001 Matters)**

**Proposals for WRC-2000 Agenda Item 7.2**

**A. Proposal 1 (WAC/092(24.06.99))**

**United States of America  
Proposal for the Work of the Conference**

**Proposal to amend Resolution 722, Agenda Item 2.4**

**BACKGROUND:** The availability of modern technology makes possible substantial improvements in HF maritime communications. Agenda Item 2.4 stems from extensive discussions of maritime telecommunications at WRC-97. Resolution 347 notes the use of HF A1A Morse radiotelegraphy is steadily diminishing and that Administrations are converting to digital telecommunications on a non-interference basis and recommends that WRC-2000 make changes to Appendices S17 and Article S52 as needed.

**WRC-2003 Preliminary Agenda Item 2.4** - review of the frequency and channel arrangements in the MF and HF bands allocated on a primary basis to the maritime - mobile service, taking into account the use of new digital technology, in accordance with Resolution 347 (WRC-97). The text of this Agenda Item is contained in Resolution 722 (WRC-97).

**ISSUE:** Broadening the scope of Agenda Item 2.4 to permit consideration of other HF maritime matters.

Resolution 347 was addressed to WRC-1999 (now WRC-2000). With modern technology readily available, the world's shipping interests should be permitted to upgrade their telecommunications. As worded, WRC-2003 is required to review channel arrangements in accordance with a Resolution adopted by WRC-97 and addressed to WRC-99 (now 2000).

**PROPOSAL:** The U.S. proposes that WRC-2000 amend Agenda Item 2.4 of Resolution 722 to read as follows:

“review of frequency and channel arrangements in the MF and HF band allocated on a primary basis to the maritime mobile service, taking into account the use of new digital technology, ~~in accordance with~~ **noting** Resolution 347 (WRC-97).”

**FOREIGN VIEWS:** No opposition to the proposed change is anticipated.

**B. Proposal 2 (WAC/093(24.06.99))**

**United States of America  
Proposal for the Work of the Conference**

**Proposal to amend Res. 722, Agenda Item 2.6**

**Background:** The United States Government has an established need for additional primary radiolocation allocations in the bands near 3 MHz and 5 MHz in support of ongoing and new radar operations whose stations are/will be deployed on a worldwide basis. Consequently, the U.S. requested an agenda item for additional allocations at WRC-97 resulting in agenda item 2.6 for WRC-2001 as contained in Resolution 722 (WRC-97). Technical study is underway within ITU-R WP-8B and is expected to be complete by the time of WRC-2002/3. These studies are expected to show that current secondary radiolocation allocations can be upgraded to the primary category and share with the existing primary allocations.

**Proposal:** The proposal herein amends agenda item 2.6 of Resolution 722:

RESOLUTION 722 (WRC-97)

**Preliminary Agenda for the 2001 World  
Radiocommunication Conference**

The World Radiocommunication Conference (Geneva, 1997),

*resolves to give the view*

that the following items should be included in the preliminary agenda of WRC-01, to be held in late 2001:

2.6 to consider the status of allocations to the radiolocation service in the bands around 3.0 GHz and around 5.5 GHz, ~~the date of a conference is under discussion;~~

**Reason:** To ensure this agenda item is retained for WRC-2002/3

**C. Proposal 3 (WAC/099(24.06.99))**

**Modification to Resolution 722**

Preliminary Agenda for the 2001<sup>1</sup> World Radiocommunication Conference

Add Section 2.13 bis allocations on a worldwide basis for feeder links for mobile satellite systems operating service links in the 1-3 GHz range

**Reason:** WRC-95 addressed the spectrum needs for feeder links for non-geostationary mobile satellite services, and made limited allocations in the 4-30 GHz range. Both geostationary (GSO) and non-geostationary (NGSO) mobile satellite systems are now being implemented in the 1-3 GHz range. Further proposals have been made to implement additional GSO and NGSO systems in the 2 GHz and 2.5 GHz bands. The WRC-00 conference will be considering service link spectrum allocations to both the terrestrial and satellite component of IMT-2000. These events make it necessary to consider additional spectrum allocations for MSS feeder links. The proposal would place the item on the agenda for WRC-2002/3 so that appropriate studies could be completed prior to the conference by the ITU-R as a part of the conference preparatory process.

**D. Proposal 4 (WAC/100 (24.06.99))**

**Modification to Resolution 722**

Preliminary Agenda for the 2002/3 World Radiocommunication Conference

**Add a new Section (2.xx) or (3.xx)**

**Additional allocations on a worldwide basis for service links of non-geostationary mobile satellite systems (NGSO/MSS) in the 1-3 GHz range**

**Reason:** WRC-92 allocated spectrum for the service links of non-geostationary mobile satellite systems in the 1610-1626.5 MHz and 2483.5-2500 MHz frequency bands. WRC-95 and WRC-97 Conferences took decisions regarding the use of the 2 GHz band by the service links of NGSO/MSS systems. WRC-00 is expected to consider spectrum allocation for IMT-2000 systems. The IMT-2000 systems include both the terrestrial and satellite components. The satellite component of IMT-2000 is considered to be part of the services offered by GSO and NGSO MSS systems. Both geostationary and non-geostationary mobile satellite systems are either in operation or are being implemented. Further, many new systems have

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<sup>1</sup> PP-98 refers to this WRC as WRC-2002/3.

been proposed for implementation in the 1-3 GHz band. It is therefore necessary that the spectrum requirements for the service links of NGSO/MSS systems will need to be further examined at the WRC-2002/3 Conference, with the objective of making additional allocations, if required. The ITU-R will have an opportunity to complete the needed sharing and performance studies as part of the Conference Preparatory Process.

**E. Proposal 5** (WAC/101(24.06.99)) – Note: The following proposal does not include some items that IWG-5 recommended, but IWG-10 was not able to consider. We invite comments on whether any of the other items that were removed from the WRC-2000 agenda by the 1998 ITU Council should also be added to the agenda of WRC-02/03.

**United States Of America**  
**Proposal for the Work of the Conference**

**Proposal to Amend Resolution No. 722**  
**To Add Selected Items From Resolution No. 721 That Were Not**  
**Included on the WRC-2000 agenda**

Background: In Resolution No. 721, the WRC-1997 included several agenda items for possible inclusion on the WRC-2000 agenda. It left that decision to the ITU Council. These items, numbered 8.1 through 8.8, were not included in the agenda for this conference by Council in its Resolution 1130. Therefore, it seems appropriate that the 2000 WRC review these items again to see if they are still appropriate for consideration by a future WRC.

Proposal: The United States has reviewed agenda items 8.1 through 8.8 from Resolution No. 721. We propose that items 8.1, 8.2, 8.3, and 8.4 be included in the agenda for WRC-2002/3.

Resolution No. 722

Preliminary Agenda For The  
2001 (2002/3) World Radiocommunication Conference

- Add 2. bis      to consider the regulatory and technical provisions for the quasi-geostationary satellite networks;
- to examine the spectrum requirements for telemetry, tracking and telecommand of fixed satellite service networks operating with service links in the frequency bands above 17 GHz;
- to review the use of the frequency band 415-526.5 kHz by the aeronautical radionavigation and maritime mobile services;

to review the use of the HF bands by the aeronautical mobile (R) and maritime mobile services with a view to meeting the changing needs of these services.

Reason: The United States proposes that these items be treated by the WRC-2002/3, in view of the ongoing studies in the ITU-R, and in view of the changing needs of the services indicated.

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**F. Other proposals approved by IWG-10** (WAC/094(24.06.99), WAC/095(24.06.99), WAC/096(24.06.99), WAC/097(24.06.99) and WAC/098(24.06.99)

These documents originated in Informal Working Group 2 (IWG-2) and were edited and approved by IWG-10. The resulting proposals are shown under IWG-2.

#### **VIII. Draft Proposals of NTIA's Radio Conference Subcommittee**

**A. Proposal Set 1 - WRC-2000 Agenda Items 1.3, 1.4 (Resolutions 126 (WRC-97) and 726 (WRC-97)), 1.6.2, 1.7 (aeronautical) and 1.18 (simplex use of duplex channels) (WAC/102(03.06.99))**

**B. Proposal Set 2 - WRC-2000 Agenda Items 1.4 (Resolution 134 (WRC-97)), 1.4 (Resolution 726 (WRC-97)), 1.7 (maritime), 1.15.1 and 1.18 (interoperable technologies) (WAC/103(10.06.99))**

**C. Proposal Set 3 - WRC-2000 Agenda Items 1.6.1 and 1.16 (WAC/104(15.06.99))**

These sets of proposals are not reproduced here but are available on the FCC's WRC-2000 web site.

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